SAMSUNG

DIGITAL LASER MFP

SCX-4216F
SCX-4116
SCX-4016

SERVICE *Manual*

DIGITAL LASER MFP

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Samsung Electronics
Digital Printing CS Group
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1. Precautions

The cautions in the below are items needed to keep in mind when maintaining and servicing.
Please read carefully and keep the contents in mind to prevent accidents while servicing and to prevent that the machine gets damage.

1.1 Warning for safety.

(1) Request the service by qualified service person.
The service for this machine must be performed by a service person who took the additional education of this field. It is dangerous if unqualified service person or user tries to fix the machine.

(2) Do not rebuild it discretionary.
Do not attach or change pats discretionary. Do not dissemble, fix, and rebuilt it. If do, printer will abnormally work and electric shock or a fire can be occurred.

(3) Laser Safety Statement
The Printer is certified in the U.S. to conform to the requirements of DHHS 21 CFR, chapter 1 Subchapter J for Class 1(1) laser products, and elsewhere, is certified as a Class I laser product conforming to the requirements of IEC 825. Class I laser products are not considered to be hazardous. The laser system and printer are designed so there is never any human access to laser radiation above a Class I level during normal operation, user maintenance, or prescribed service condition.

Warning >> Never operate or service the printer with the protective cover removed from Laser/Scanner assembly. The reflected beam, although invisible, can damage your eyes. When using this product, these basic safety precautions should always be followed to reduce risk of fire, electric shock, and injury to persons.

CAUTION - INVISIBLE LASER RADIATION WHEN THIS COVER OPEN. DO NOT OPEN THIS COVER.

VORSICHT - UNSICHTBARE LASERSTRAHLUNG, WENN ABDECKUNG GE FFNET. NICHT DEM STRAHL AUSSETZEN.

ATTENTION - RAYONNEMENT LASER INVISIBLE EN CAS D OUVERTURE. EXPOSITION DANGEREUSE AU FAISCEAU.

ATTENZIONE - RADIAZIONE LASER INVISIBILE IN CASO DI APERTURA. EVITARE L ESPOSIZIONE AL FASCIO.

PRECAUCION - RADIACION LASER IVISIBLE CUANDO SE ABRE. EVITAR EXPONERSE AL RAYO.

ADVARSEL. - USYNLIG LASERSTR LNING VED BNING, N R SIKKERHEDSBRYDERE ER UDE AF FUNKTION. UNDG UDSAETTELSE FOR STR LNING.

ADVARSEL. - USYNLIG LASERSTR LNING N R DEKSEL PNES. STIRR IKKE INN I STR LEN. UNNG EKSPONERING FOR STR LEN.

VARNING - OSYNLIG LASERSTR LNING N R DENNA DEL R PPNAD OCH SP RREN R URKOPPLAD. BETRAKTA EJ STR LEN. STR LEN R FARLIG.

VARO! - AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA N KYM TT M LLE LASER-S TEILYLLE L KATSO S TEESEEN.

注 意 - 严禁渴开此盖, 以免激光泄露灼伤

주 의 - 이 덮개를 열면 레이저광에 노출될 수 있으므로 주의하십시오.

1.2 Caution for safety

1.2.1 Precaution related noxious material

There is a possibility to get harm from noxious material if you ignore the below information.

(1) Do not touch the damaged LCD. This PRINTER has LCD in control panel. Noxious liquid to human body exists in the LCD. If it is got into mouth, immediately see a doctor. If it is got into eyes or on skin, immediately wash off over 15 minutes with flowing water and see a doctor.

(2) The toner in a printer cartridge contains a chemical material, which might harm human body if it is swallowed. Please keep children out of the toner cartridge.

1.2.2 Precaution related electric shock or fire

It is possible to get electric shock or burn by fire if you don't fallow the instructions of the manual.

(1) Use exact voltage. Please do use an exact voltage and wall socket. If not, a fire or an electric leakage can be caused.

(2) Use authorized power code. Do use the power code supplied with PRINTER. A fire can be occurred when over current flows in the power code.

(3) Do not insert many codes in an outlet. If do, a fire can be occurred due to flow over current in an outlet.

(4) Do not put water or extraneous matter in the PRINTER. Please do not put water, other liquid, pin, clip, etc. It can cause a fire, electric shock, or malfunction. If it is happened, turn off the power and remove the power plug from outlet immediately.

(5) Do not touch the power plug with wet hand. When servicing, do remove the power plug from outlet. And do not insert or take off it with wet hand. Electric shock can be occurred.

(6) Caution when inserting or taking off the power plug. The power plug has to be inserted completely. If not, a fire can be caused due to poor contact. When taking off the power plug, do grip the plug and take it off. If grip the line and pull over, it could be damaged. A fire or electric shock could cause.

(7) Management of power code. Do not bend, twist, or bind it and place other materials on it. Also, do not fix it with staples. If the power code gets damage, a fire or electric shock can be caused. A damaged power code must be replaced immediately. Do not repair the damaged part and reuse it. A repaired part with plastic tape can be occurred a fire or electric shock. Do not spread chemicals on the power code. Do not spread insecticide on the power code. A fire or electric shock can be occurred due to thinner(weak) cover of the power code.

(8) Check whether the power outlet and the power plug are damaged, pressed, chopped, or blazing fire or not. When such inferiorities are found, repair it immediately. Do not make it pressed or chopped when moving the machine.

(9) Caution when thundering, and being flash of lightening. It causes a fire or electric shock. Take the power plug off when thundering. Do not touch cable and device when thundering and being flash of lightening.

(10) Do avoid the place where is moisture or has dust. Do not install the printer in where have lots of dust or around humidifier. A fire can be occurred. A plug part need to clean well with dried fabric to remove dust. If water drops are dripped on the place covered with dust, a fire can be occurred.

(11) Avoid direct sunlight. Do not install the printer near to window where directly contacts to the sunlight. If the machine contacts sunlight long time, the machine cannot work properly because inner temperature of the machine is getting higher. A fire can be caused.

(12) Turn off the power and take off the plug when a smoke, strange smell, or sound from the machine. If you keep using it, a fire can be occurred.

(13) Do not insert steel or metal piece inside/outside of the machine. Do not put steel or metal piece into a ventilator. An electric shock could be happened.

1.2.3 Precaution related handling the machine.

If you ignore this information, you could get harm and machine could be damaged.

(1) Do not install it on the different levels, or slanted floor.
Please confirm whether it is balanced or not after installation. If it is unbalanced, an accident can be happened due to the machine fell over.
(2) Be careful not to insert a finger or hair in the rotating unit.
Be careful not to insert a finger of hair in the rotating unit (motor, fan, paper feeding part, etc) while the machine is operating. Once it happens, you could harm.
(3) Do not place a pot contains water/chemical or small metals. If those are got into the inner side of machine, a fire or electric shock can be occurred.
(4) Do not install it in where lots of moisture or dust exists or where raindrop reaches. A fire or electric shock can be caused.
(5) Do not place a candlelight, burning cigarette, and etc. on the machine. Do not install it near to heater. A fire can be occurred.

1.2.4 Precaution when assembly/disassembly

When replace parts, do it very carefully. Do memorize the location of each cable before replace parts for reconnecting it afterwards. Do memorize. Please perform the below before replace or disassembly the parts.

(1) Check the contents stored in the memory. All the information will be erased after replace main board. The information needed to keep has to be written down.
(2) Before servicing or replacing electric parts, take off a plug.
(3) Take off printer cables and power code connected to printer.
(4) Do use formal parts and same standardized goods when replacing parts.Must check the product name, part code, rated voltage, rated current, operating temperature, etc.
(5) Do not give an over-force when release or tighten up the plastic parts.
(6) Be careful not to drop the small parts such as screws in the printer.
(7) Be careful not to change the location of small parts such as screws when assembling and disassembling.
(8) Do remove dust or foreign matters completely to prevent fire of tracking, short, or etc.
(9) After finished repair, check the assembling state whether it is same as before the repair or not.

1.3 ESD Precautions

Certain semiconductor devices can be easily damaged by static electricity. Such components are commonly called “Electrostatically Sensitive (ES) Devices”, or ESDs. Examples of typical ESDs are: integrated circuits, some field effect transistors, and semiconductor “chip” components.
The techniques outlined below should be followed to help reduce the incidence of component damage caused by static electricity.

Caution >>Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

1. Immediately before handling a semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, employ a commercially available wrist strap device, which should be removed for your personal safety reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ESDs, place the assembly on a conductive surface, such as aluminum or copper foil, or conductive foam, to prevent electrostatic charge buildup in the vicinity of the assembly.
3. Use only a grounded tip soldering iron to solder or desolder ESDs.
4. Use only an “anti-static” solder removal device. Some solder removal devices not classified as “anti-static” can generate electrical charges sufficient to damage ESDs.
5. Do not use Freon-propelled chemicals. When sprayed, these can generate electrical charges sufficient to damage ESDs.
6. Do not remove a replacement ESD from its protective packaging until immediately before installing it. Most replacement ESDs are packaged with all leads shorted together by conductive foam, aluminum foil, or a comparable conductive material.
7. Immediately before removing the protective shorting material from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.
8. Maintain continuous electrical contact between the ESD and the assembly into which it will be installed, until completely plugged or soldered into the circuit.
9. Minimize bodily motions when handling unpackaged replacement ESDs. Normal motions, such as the brushing together of clothing fabric and lifting one’s foot from a carpeted floor, can generate static electricity sufficient to damage an ESD.

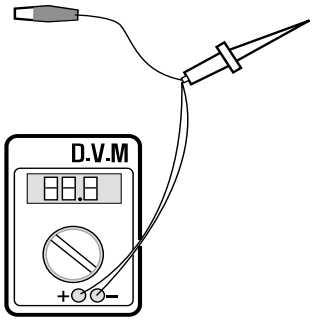
2. Reference Information

This chapter describes the reference information for applying this training manual, and it is consisted of the tool list, the abbreviation table, the outline of model, and so on.

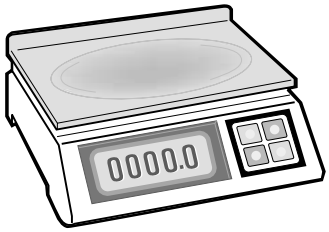
2.1 Tool for Troubleshooting

The following tools are recommended for safe and smooth troubleshooting described in this service manual.

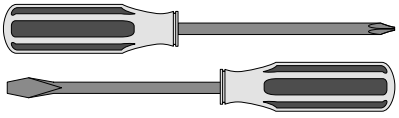
1 **DVM(Digital Volt Meter)**
Standard: Indicates more than 3 digits.



2 **Electronic Scale**
Standard: Equipment to check the weight of consumables supplied by Samsung Electronics.
(The gram unit can be measured.)



3 **Driver**
Standard : "-" type, "+" type (M3 long, M3 short, M2 long, M2 short).

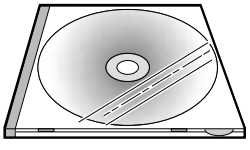


4 **Tweezers**
Standard: For general home use, small type.

5 **Cotton Swab**
Standard : For general home use, for medical service.

6 **Cleaning Equipments a IPA (Isopropyl Alcohol)dry cloth or a soft stuff neutral detergent.**

7 **Software(Driver) installation CD ROM**



2.2 Acronyms and Abbreviations

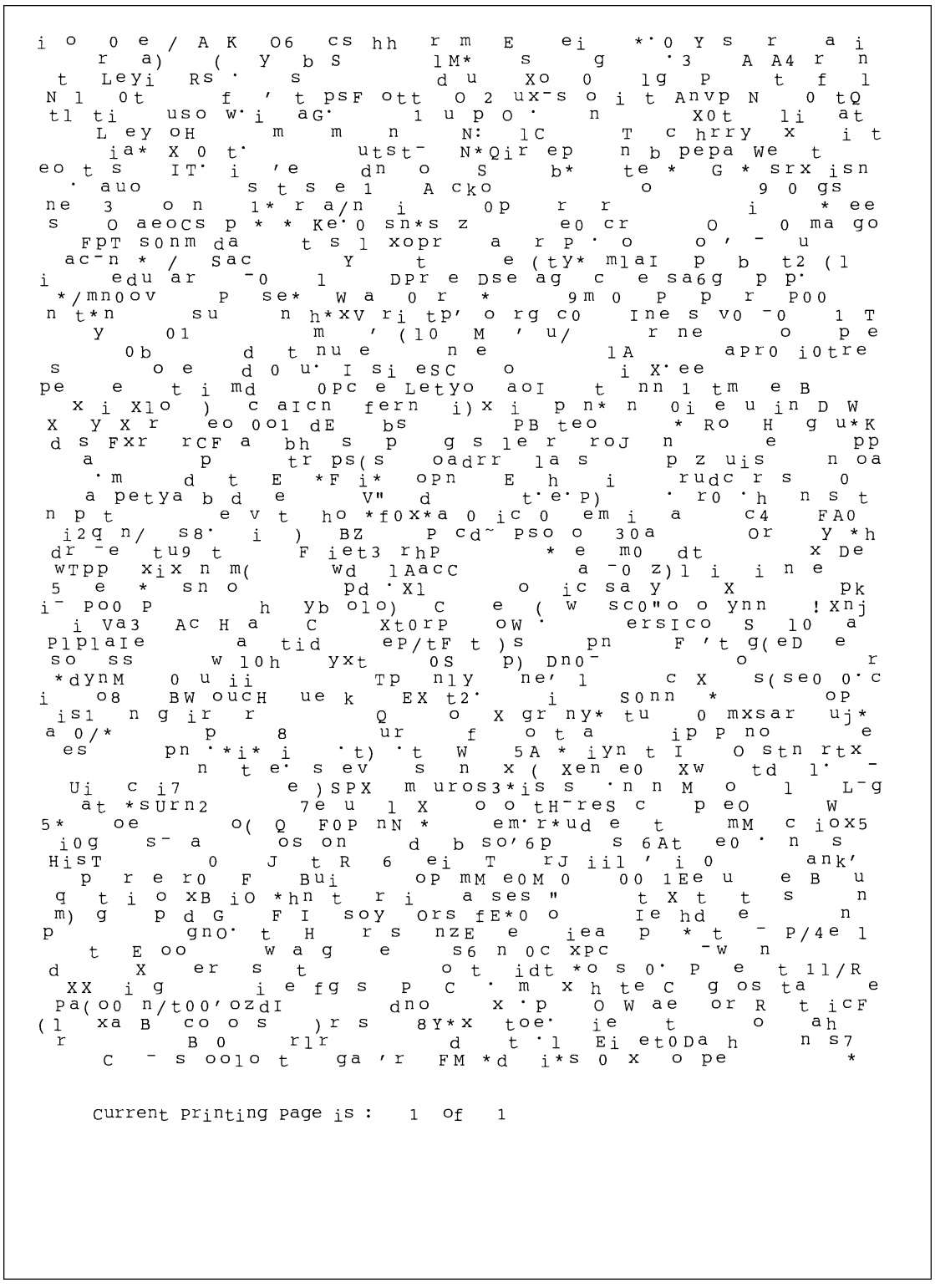
The table in the below explains abbreviations used in this service manual.
The contents of this service manual are declared with abbreviations in many parts. Please refer to the table.

AC	Alternating Current
ADF	Automatic Document Feeder
ASIC	Application Specific Integrated Circuit
ASSY	assembly
BIOS	Basic Input Output System
CCD	Charge Coupled Device
CMOS	Complementary Metal Oxide Semiconductor
CN	connector
CON	connector
CPU	Central Processing Unit
dB	decibel
dbA	decibelampere
dBM	decibel milliwatt
DC	direct current
DCU	Diagnostic Control Unit
DPI	Dot Per Inch
DRAM	Dynamic Random Access Memory
DVM	Digital Voltmeter
ECP	Enhanced Capability Port
EEPROM	Electronically Erasable Programmable Read Only Memory
EMI	Electro Magnetic Interference
EP	electrophotographic
EPP	Enhanced Parallel Port
F/W	firmware
GDI	graphics device interface
GND	ground
HBP	Host Based Printing
HDD	Hard Disk Drive
HV	high voltage
HVPS	High Voltage Power Supply
I/F	interface
I/O	Input and Output
IC	integrated circuit
IDE	Intelligent Drive electronics or Imbedded Drive Electronics
IEEE	Institute of Electrical and Electronics Engineers. Inc
IPA	Isopropy Alcohol
IPM	Images Per Minute
LAN	local area network
lb	pound(s)
LBP	Laser Beam Printer
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LSU	Laser Scanning Unit
MB	Megabyte
MHz	Megahertz
NVRAM	Nonvolatile random access memory
OPC	Organic Photo Conductor
PBA	Printed Board Assembly
PCL	Printer Command Language , Printer Control Language
PDL	Page Discription Language
PPM	Page Per Minute
PTL	Pre-Transfer Lamp
Q'ty	Quantity
RAM	Random Access Memory
ROM	Read Only Memory
SCF	Second Cassette Feeder
SMPS	Switching Mode Power Supply
SPGP	Samsung Printer Graphic Processor
SPL	Samsung Printer Language
Spool	Simultaneous Peripheral Operation Online
SW	Switch
Sync	Synchronous or synchronization
USB	Universal Serial Bus

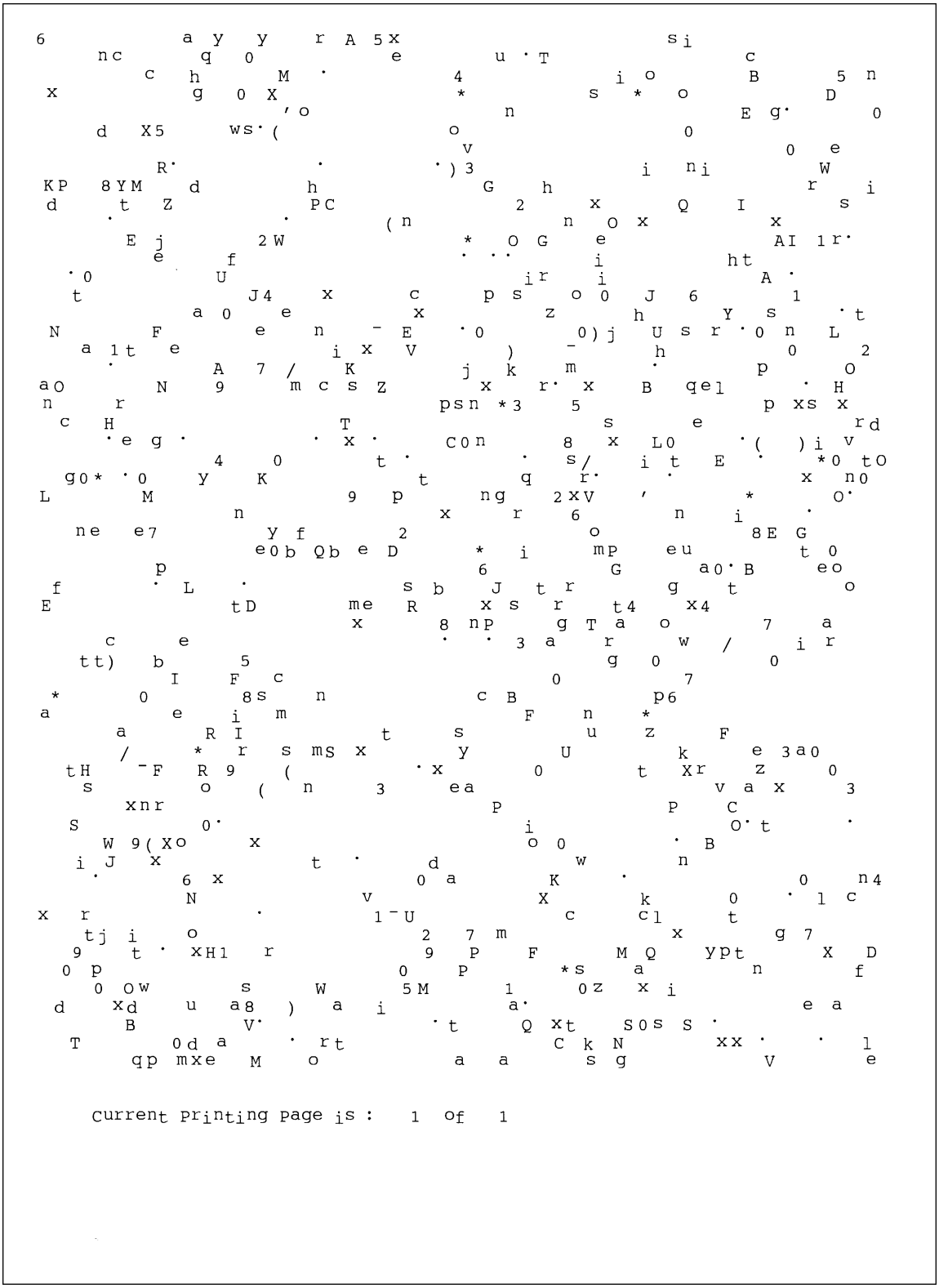
2.3 The Sample Pattern for the Test

The sample pattern shown in below is the standard pattern used in a factory.
The contents of the life span and the printing speed are measured with the pattern shown in below.
(The picture in the manual is 70% size of the actual A4 size.)

2.3.1 A4 5% Pattern



2.3.2 A4 2% Pattern

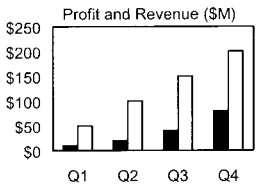


2.3.3 A4 IDC 5% Patten

INTEROFFICE MEMORANDUM

TO: Cathy Scott
FROM: Lane Wolters
SUBJECT: The Typical Printed Page
DATE: 07/14/09

What does the typical laser printer document look like? Well, across the diverse business community it would be impossible to capture all aspects of printing style within a single page document. However, if attention is focused on the majority of printing volume, text and simple business graphics would stand out as the most prevalent output from laser printers. This sample memo represents a reasonable example of the typical business document. This memo covers approximately 5% of a letter or A4-sized piece of paper. This number (5%) has historically been called the "average" page coverage by laser printer manufacturers. It may seem to the naked eye that there is much more than 5%, but in fact, alphanumeric characters rely on a large portion of white space for their composition.



Mileage Chart

City	London	Los Angeles	New York	Tokyo
London	--	5456	3453	5975
Los Angeles	5456	--	2468	5451
New York	3453	2468	--	6736
Tokyo	5975	5451	6736	--

There are many factors that can influence the actual page coverage of a document as well as the page-yield of a toner cartridge. Testing parameters such as font size and style, internal printer settings, print environment, paper stock, sample size, job length and criteria for determining "end of life", can all influence how long a toner cartridge will last. The best competitive analysis of printer page yield should occur under similar conditions using industry standards for the variables listed above.

1 of 1

MEMO

3. Specifications

Specfications are correct at the time of printing. Product specifications are subject to change without notice. See below for product specifications.

3.1 General Specifications

Items			Descriptions	Remarks
Major Features		SCX-4016	Copier, Print, Scan	Without ADF
		SCX-4116	Copier, Print, Scan	With ADF
		SCX-4216F	Copier, Print, Scan, Fax	With ADF
Size (W*D*H)		SCX-4016	474x436x353mm	
		SCX-4216F/4116	474x436x417mm	
Weight		SCX-4016	11.7 Kg (25.8 lbs)	With Toner Cartridge
		SCX-4216F/4116	13 Kg (28.8 lbs)	With Toner Cartridge
LCD			16*2 Char	
I/O Interface			USB1.1 & IEEE1284	
Power Consumption	Printing		350W	
	Sleep Mode		20W	
Power Switch			Yes	
* Noise	Operating	SCX-4016	Less than 52 dBA	
		SCX-4216F/4116	Less than 55 dBA	
	Standby	SCX-4016	Less than 39 dBA	
		SCX-4216F/4116	Less than 39 dBA	
Warm Up			Less than 42 seconds	
Approval			Class B	
Device Memory			16 MB (Printer : 8M, Fax : 4M, Scan : 2M, System : 2M)	
Internal N/W Connectivity			N/A	

* Sound Pressure Level, ISO 7779

3.2 Print Specification

Items		Descriptions	Remarks
** Print Speed		Up to 17 PPM in A4 size, IDC 5% pattern	Letter size, 5% Character Pattern
Print Method		Laser Scanning Unit + Electro Photography	
Print Language		SPL	
Power Save		Yes(5/10/15/30/45min.)	
Resolution	Normal	Up to 600 x 600 DPI effective output	
	RET	No	
Toner Save		Yes	
Memory		8 MB	
FPOT	Stand by	Approx. 12 seconds	
	Power Save	Less than 54 seconds	
Printable Area		207.6 X 270.6 mm (Letter)	
Toner Save		Yes	

** Print speed will be affected by Operating System used, computing performance, application software, connecting method, media type, media size and job complexity.

3.3 Scan Specification

Items		Descriptions		Remarks
Halftone(Gray Scale)		256 level		
Scan Method		Color CCD		ITU-T #1 Chart
*Scan Speed (seconds/scan)	ADF (SCX-4216F/4116)	Up to 25 Sec		Text/Mixed Mode : B/W Letter & 300dpi. (USB)
		Up to 72 Sec		Photo Mode : Gray Letter & 300dpi. (USB)
	Platen	Up to 23 Sec		
Resolution	Optical	Up to 600 x 600 DPI effective output		
	Enhanced	USB	Up to 4800 x 4800 DPI effective output	
		Parallel	Up to 2400 x 2400 DPI effective output	
Halftone		256 level		
Scan Width	Width	Max.216mm (8.5")		
	Length(Adf)	Max. 356mm (14.0")		
	Length(Platen)	Max. 297mm (11.7")		
Scan-to		E-mail, Image, OCR, FAX, WEB		

* Scan speed will be affected by Operating System used, computing performance, application software, connecting method, media type, media size and job complexity.

3.4 Copy Specification

Items		Descriptions		Remarks
Copy Quality Selection or Original Image type selection Mode	Text	600x300dpi		
	Auto	600x300dpi		
	Photo	600x600dpi for Platen / 600x300dpi for ADF		
	Other	-		
FCOT	Platen	Power Save	Approx. 54 seconds	
		Stand by	Approx. 12 seconds	
	ADF	Power Save	Approx. 54 seconds	
		Stand by	Approx. 17 seonds	
* Copy speed / Letter	Text Mixed	SDMC	Up to 6 CPM in A4 size, Up to 17 CPM in Letter size	
		MDMC	Up to 7 CPM in A4 size, Up to 17 CPM in Letter size	
	Photo	SDMC	Up to 16 CPM	
		MDMC	Up to 4 CPM	
Resolution	Scan	Up to 600 x 600 DPI effective output		
	Print	Up to 600 x 600 DPI effective output		
Zoom Range		25% to 400 %		
Multi Copy		1~99		
Preset		Yes		
Contrast Control		3 level(by LED)		
Copy Mode		TEXT/MIXED/PHOTO		
Collation Copy		Yes(300dpi only)		SCX-4216F/4116
Auto return to default mode		Yes(after 1 minute)		
N-up copy		2-up, 4-up		SCX-4216F/4116
AutoFit Copy		Yes		Platen Only
Clone		Yes		Platen Only
Poster		Yes		Platen Only

* Copy speed will be affected by Operating System used, computing performance, application software, connecting method, media type, media size and job complexity.

3.5 Telephone Specification (SCX-4216F Only)

Items		Descriptions	Remarks
Handset		No	
On hook Dial		Yes	
Search		Yes (Phone Book)	
1-Touch Dial		10EA (3*4 Numeric Key)	
Auto dial		100 locations (Using 3*4 buttons)	
TAD I/F		No	
Tone/Pulse		Selectable in Tech Mode	
Pause		No	
Auto Redial		Yes	
Last Number Redial		Yes	
Distinctive Ring		No	
Caller ID		No	
External Phone Interface		No	
Report & List Print out	Tx/Rx Journal	Yes	
	Confirmation	2 types available (with Image TCR, w/o image TCR)	
	Help List	No	
	Auto Dial List	Yes	
	System Data List	List all user setting	
Sound Control	Ring Volume	Yes(Off,Low,MED,HIGH)	
	Key Volume	Yes(On,Off)	
	Speaker	Yes(On,Off)	

3.6 Fax Specification (SCX-4216F Only)

Items		Descriptions	Remarks
Compatibility		ITU-T G3	
Communication System		PSTN/PABX	
Modem Speed		33.6 Kbps	
TX Speed		Approx. 3 sec	
Compression		MH/MR/MMR/JPEG	
ECM		Yes	
Resolution	Std	Up to 203 x 98 DPI effective output	
	Fine	Up to 203 x 196 DPI effective output	
	S.Fine	Up to 300 x 300 DPI effective output	
*Scan Speed (ADF)	Std	Approx. 5sec/LTR	
	Fine	Approx.7.5sec/LTR	
	S.Fine	Approx.7.5sec/LTR	
Rx fax duplex print out		No	
Multiple page scan speed		Approx. 7 ppm/LTR	
Receive Mode		Fax, TEL	
Memory	Capacity	4 MB (320 pages)	
	Optional Memory	No	
	Max locations to store to 1 Group Dial	99 locations	
	Fax Forward	Yes (On/Off)	
	Broadcasting	Up to 59 locations	
	Forced Memory TX	No	
	Cover page	No	
	Delayed fax	Yes	
	Memory RX	Yes	
Functions	Voice Request	No	
	TTI	Yes	
	RTI	Yes	
	Polling	No	
	Earth/Recall	No	
	Auto Reduction	Yes	
	RDC	No	
	Junk Fax barrier	Yes	
	Security Mode	Yes	
	Battery Backup	Yes (Min. 15 minutes)	Back up Fax memory and Real Time data

* Scan speed will be affected by Operating System used, computing performance, application software, connecting method, media type, media size and job complexity.

3.7 Paper Handling

Items		Descriptions	Remarks
Capacity (20lbs)	Main Tray	250sheets	
	Bypass	Single Sheet	
Optional Cassette		No	
Output Capacity		150Sheets/20lb, 1Sheet/Face up	
Output Control		Face down	
Paper Size	Main Tray	CST : A4,Letter,Legal, Folio,Executive,B5	
	Bypass	Bypass : Envelope6 3/4,7 3/4, #9, #10, DL,C5,B5	
Paper Weight	Main Tray	16~24 lb.	
	Bypass	16~32 lb.	
Paper Path	Standard output	Bottom to Middle Front (FIFO)	
	Straight Through	Face up, Single Sheet	
Paper Size	Max	216 x 356mm(8.5"x14")	
	Min	76 x 127mm(3"x5")	
Output Stacker	Paper	Extension	
	Document	Fixed	
Input Guide	Bypass Tray	Adjustable	
	Main Tray	Universal	
	Document	Adjustable	
ADF	Paper Weight	12.5~28lb	
	Capacity	30 sheets(20lb)	
	Document Size Widtth	148mm - 216mm(5.8" - 8.5")	
	Document Size Length	127 mm - 356mm(5" - 14.0")	

3.8 Software

Items		Descriptions	Remarks
Compatibility	DOS	No	
	Win 3.x	No	
	Win 95	Yes	
	Win 98&WinME	Yes	
	Win NT 4.0	Yes	
	Win 2000	Yes	
	Win XP	Yes	WHQL for Printer Only
	Mac	Yes	Mac Printer Only
	Linux	No	
Driver	Printer	SPL	
	TWAIN	Yes	
	PC-FAX	No	PC Fax is only available through PC Modem

3.9 Consumables

Items		Descriptions	Remarks
Type		Single Cartridge	
How to install		Front door open and front loading	
Toner	Life	Up to 1,000 Sheets	Initial toner life could be different accroding to country
		Up to 3,000 Sheets	
	Level Sensor	No	
Toner Count		Yes	

MEMO

5. Disassembly and Reassembly

5.1 General Precautions on Disassembly

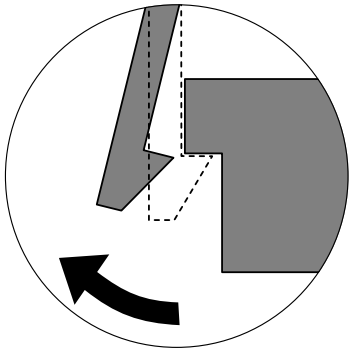
When you disassemble and reassemble components, you must use extreme caution. The close proximity of cables to moving parts makes proper routing a must.
If components are removed, any cables disturbed by the procedure must be restored as close as possible to their original positions. Before removing any component from the machine, note the cable routing that will be affected.

Whenever servicing the machine, you must perform as follows:

1. Check to verify that documents are not stored in memory.
2. Be sure to remove the toner cartridge before you disassemble parts.
3. Unplug the power cord.
4. Use a flat and clean surface.
5. Replace only with authorized components.
6. Do not force plastic-material components.
7. Make sure all components are in their proper position.

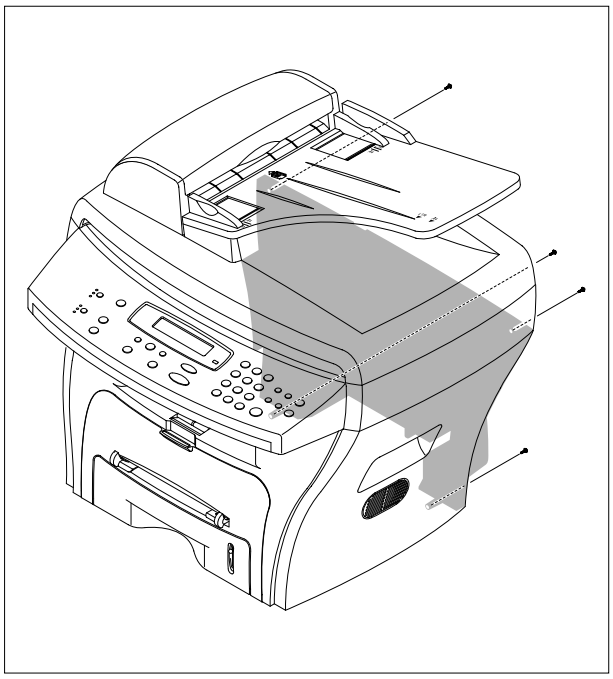
Releasing Plastic Latches

Many of the parts are held in place with plastic latches. The latches break easily; release them carefully.
To remove such parts, press the hook end of the latch away from the part to which it is latched.

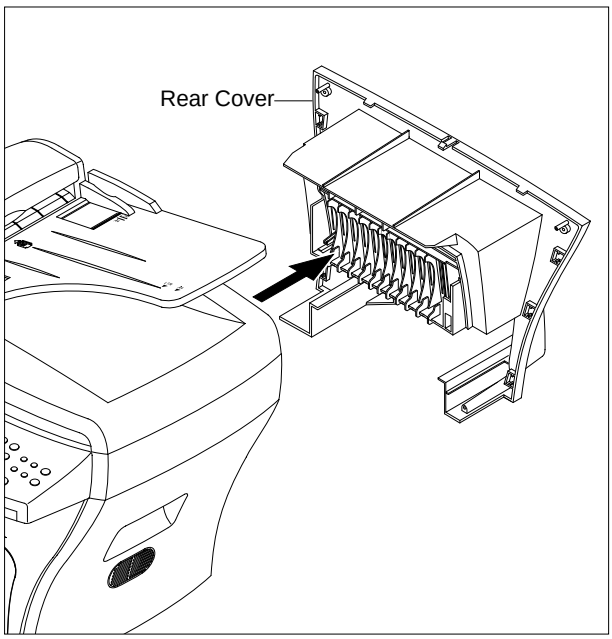


5-2 Rear Cover

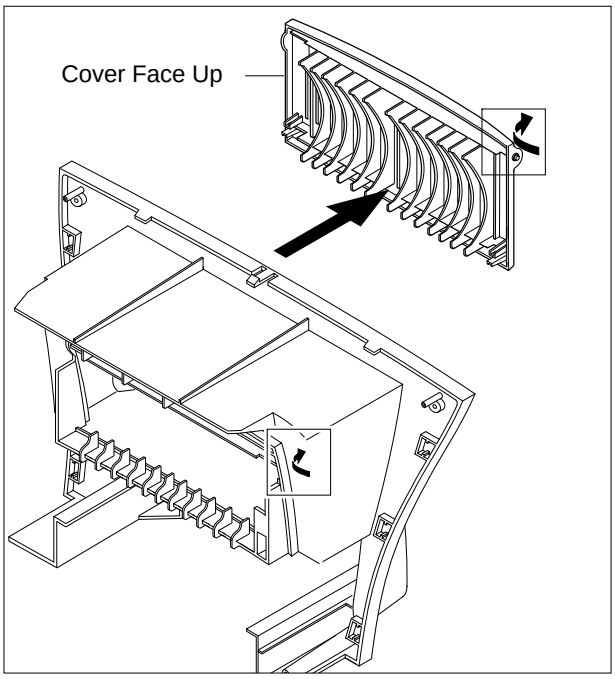
1. Remove the four screws securing the Rear Cover.



2. Remove the Rear Cover from the Frame Ass'y and Scanner Ass'y.



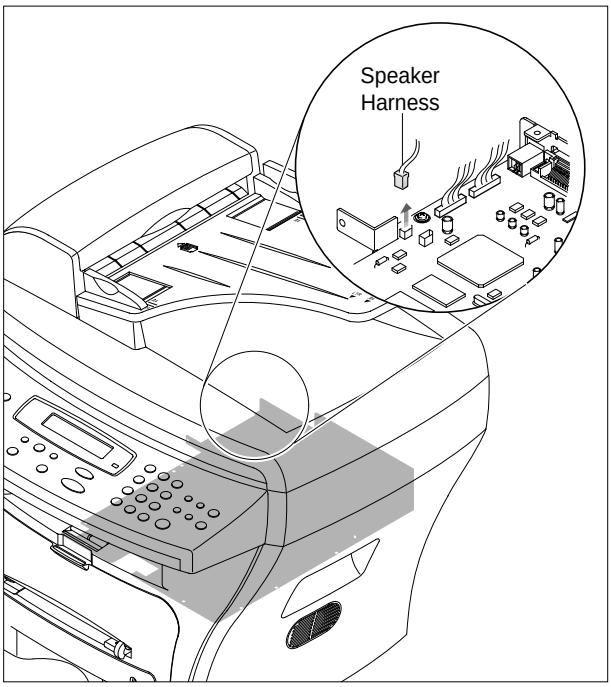
3. Unlatch the (Cover Face Up) securing the Rear cover, as shown below.Then lift the (Cover Face Up) out.



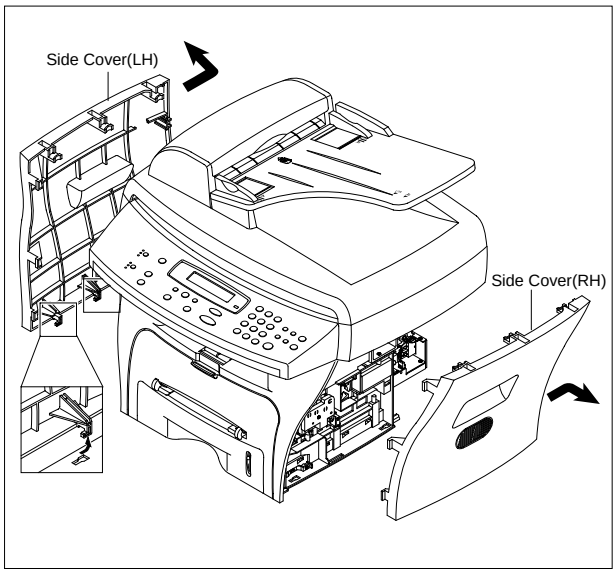
5-3 Side Cover (LH, RH)

1. Before you remove the Side Cover (LH, RH), you should remove:
   - Rear Cover (see page 5-2)

2. Unplug the Speaker Harness, as shown below.

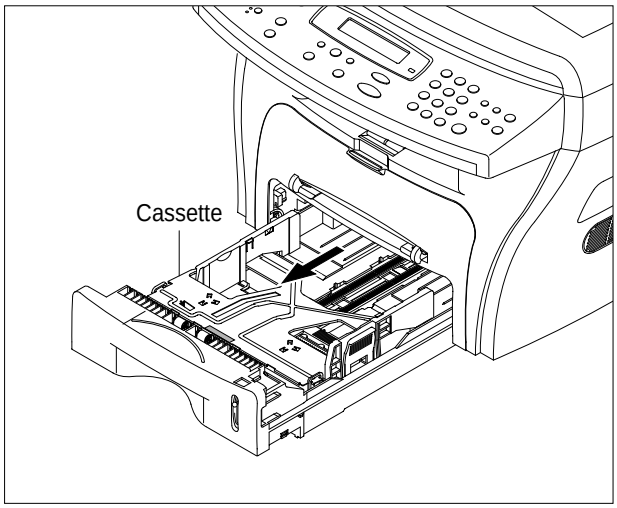


3. Lift the LH and RH Side Cover out in the direction of arrow.

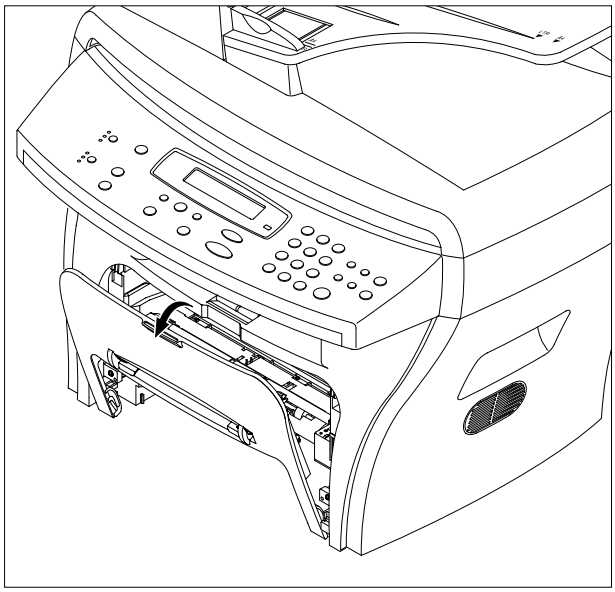


5-4 Front Cover

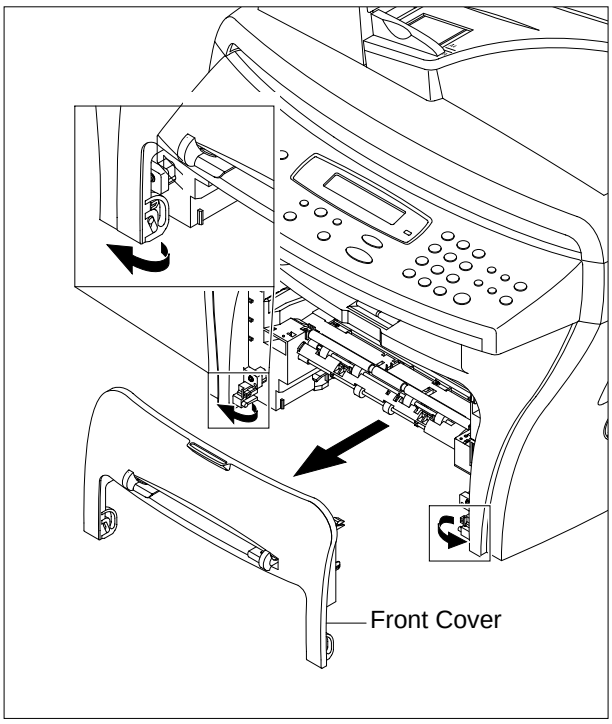
1. Take out the Cassette.



2. OPen the Front Cover.



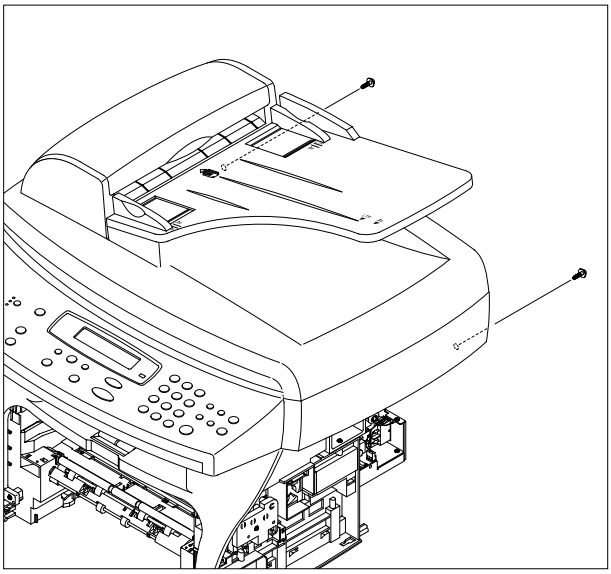
3. Unlatch the Front Cover securing the Frame Ass'y. Then remove the Front Cover, as shown below.



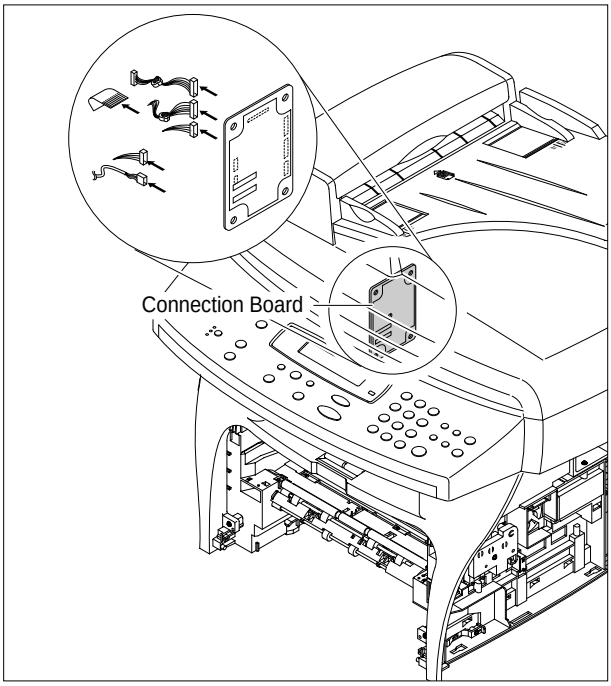
5-5 Scanner Ass'y

1. Before you remove the Scanner Ass'y, you should remove:
   - Rear Cover (see page 5-2)
   - Side Cover (LH, RH) (see page 5-3)

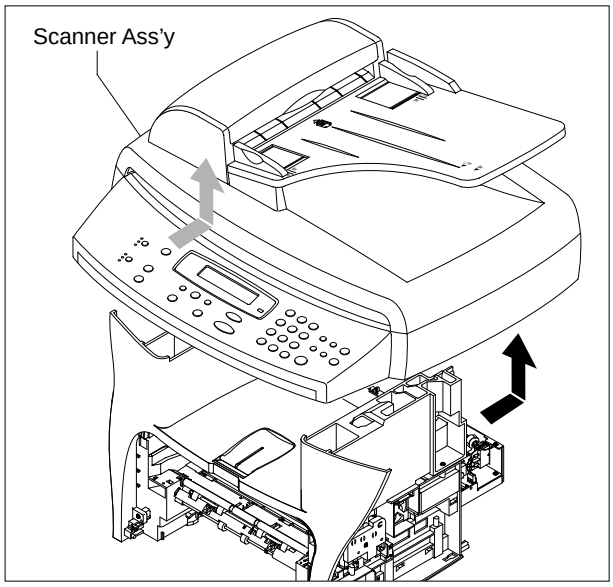
2. Remove the two screws securing the Scanner Ass'y, as shown below.



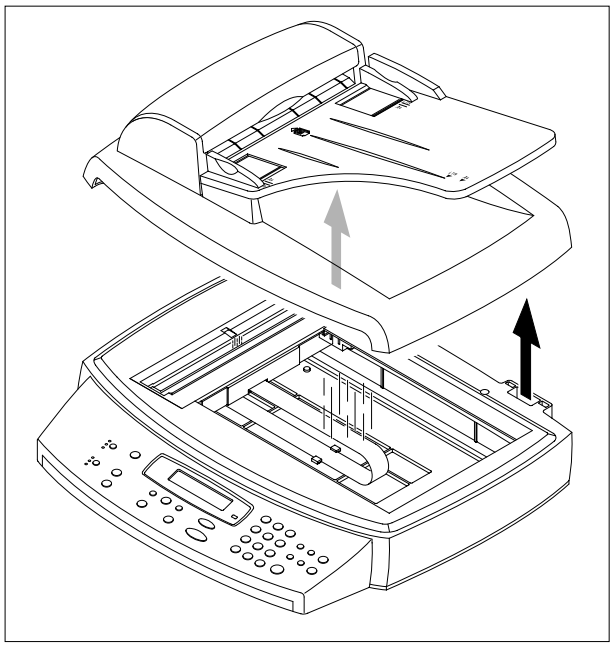
3. Unplug the 6 connectors from the Connector PBA , as shown below.



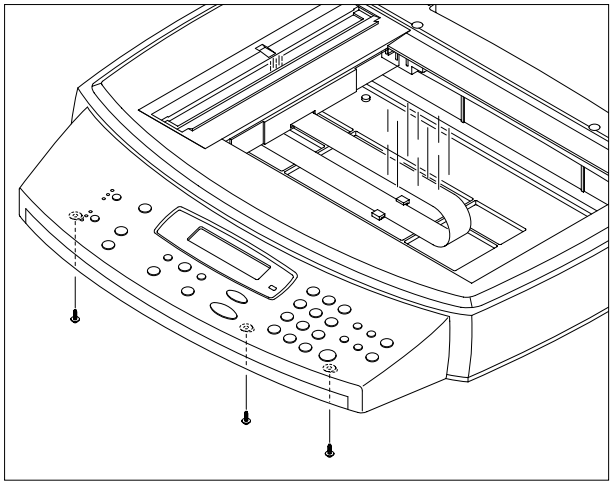
4. Pull up the Scanner Ass'y, as shown below.



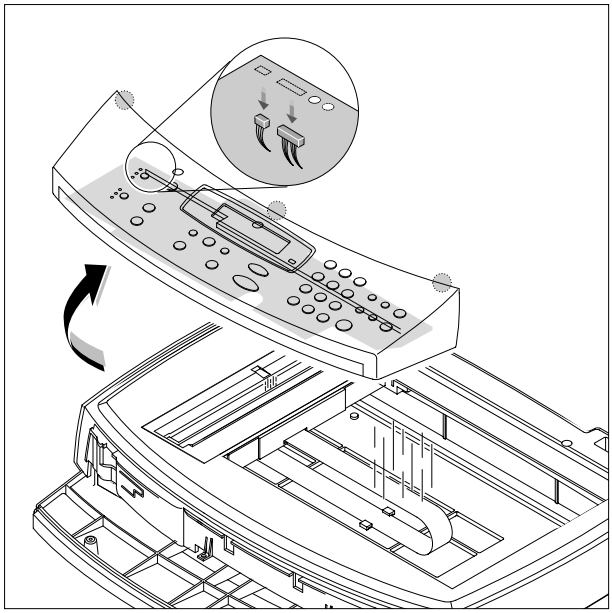
5. Pull the Platen Cover upward and remove it..



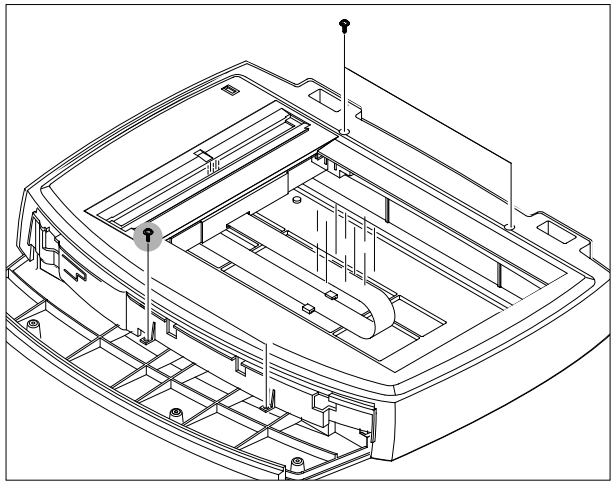
6. Remove the three screws securing the Scan Lower Ass'y.



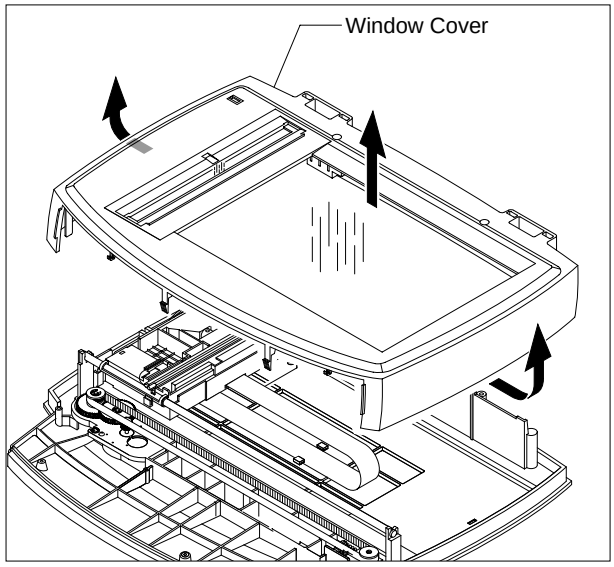
7. Lift the OPE Unit out. Then unplug the two connectors from the OPE Unit and remove it.



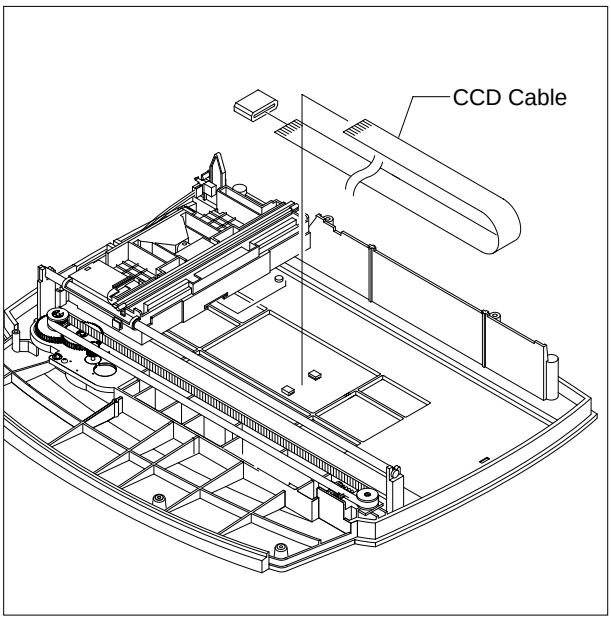
8. Remove the four screws securing the Window Cover.



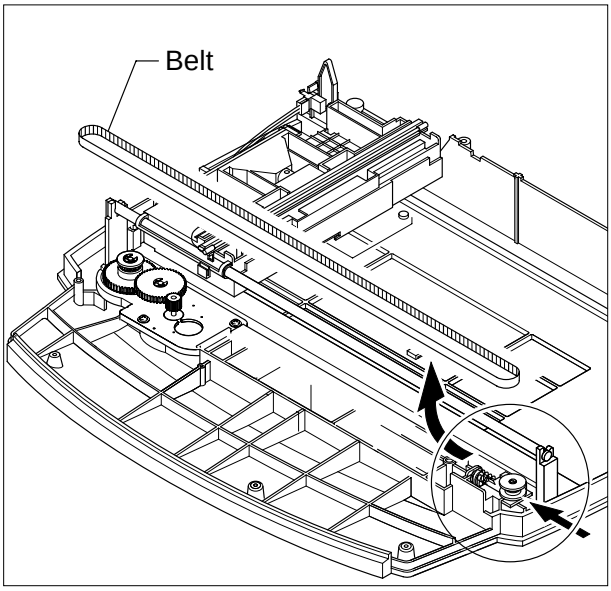
9. Unlatch the Window Cover securing the Scan Lower Ass'y Then pull the Window Cover upward and remove it..



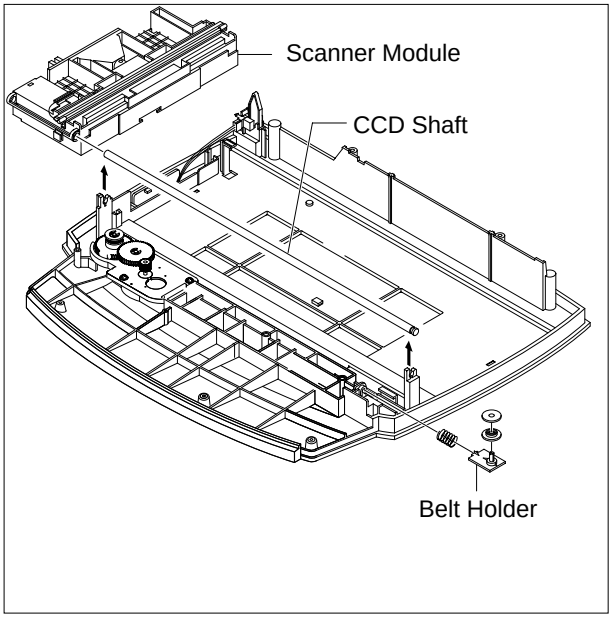
10. Remove the CCD Cable, as shown below.



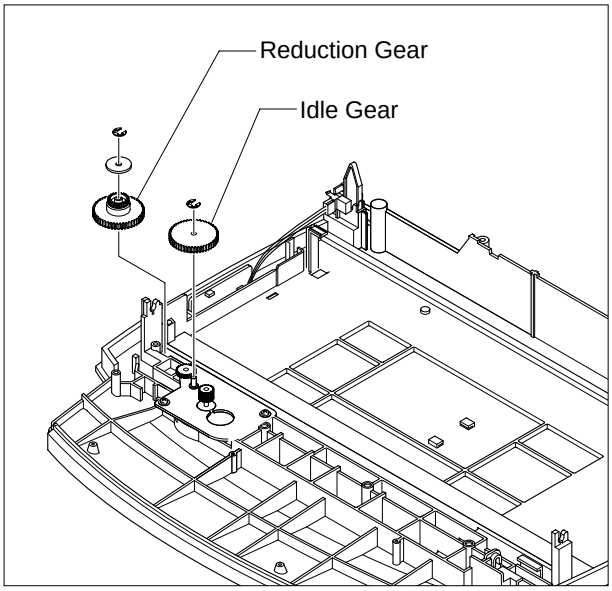
11. Push the Belt Holder and take out the Belt, as shown below.



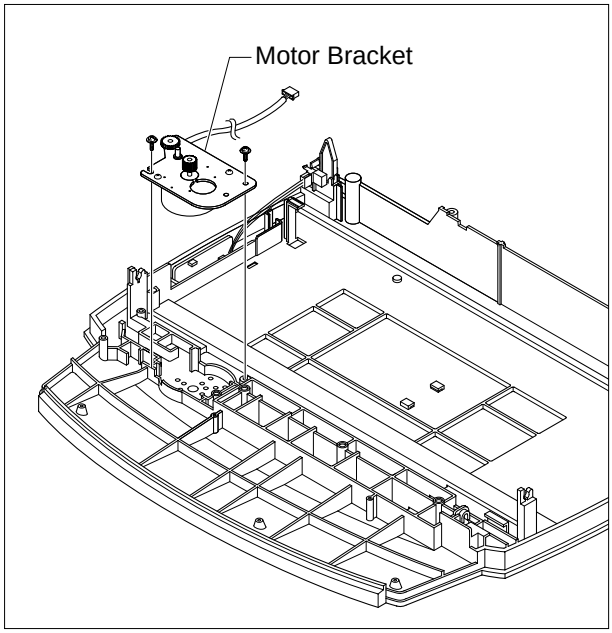
12. Pull up the CCD Shaft and take out the Scanner Module.



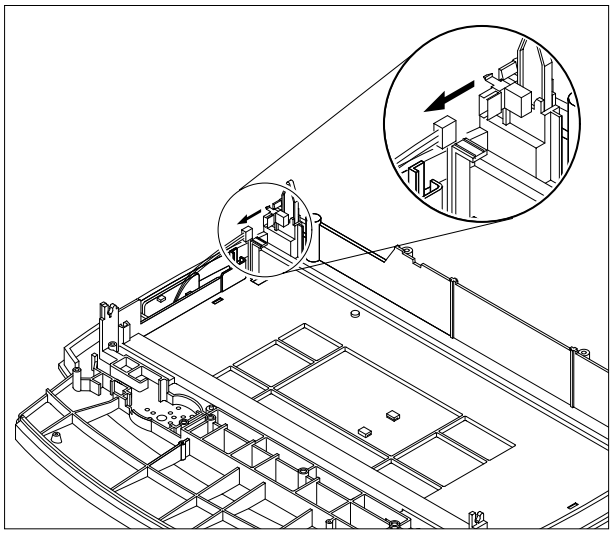
13. Remove the Reduction Gear and Idle Gear, as shown below.



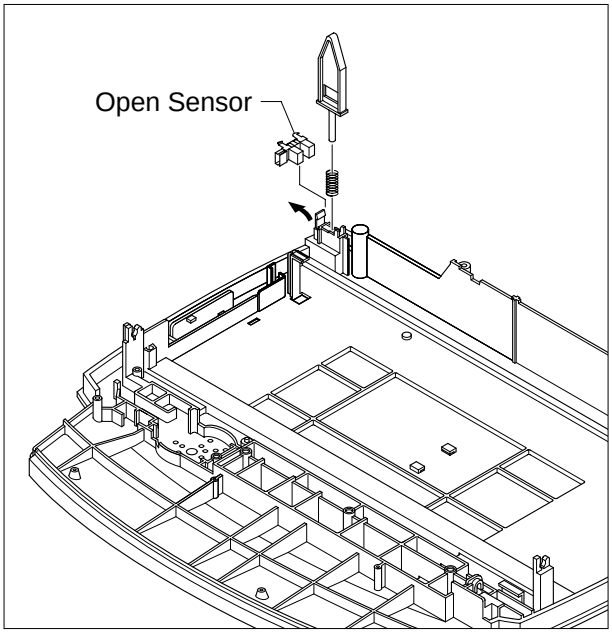
14. Remove the two screws and take out the Motor Bracket.



15. Unplug the one connector from the Open Sensor Ass'y.



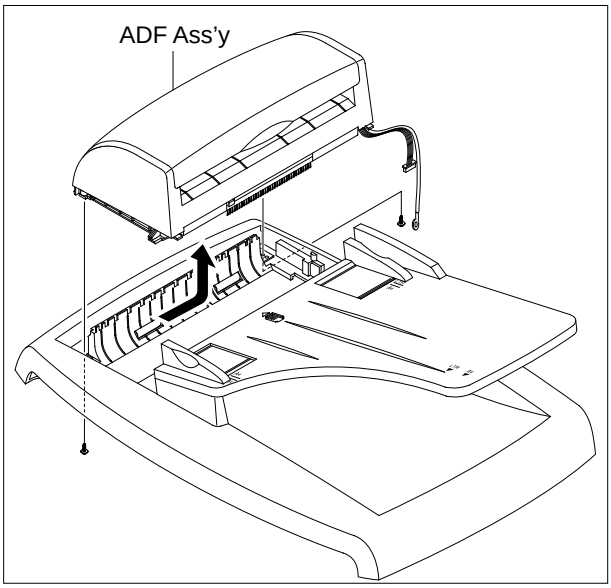
16. Unlatch the Open Sensor and remove it, as shown below.



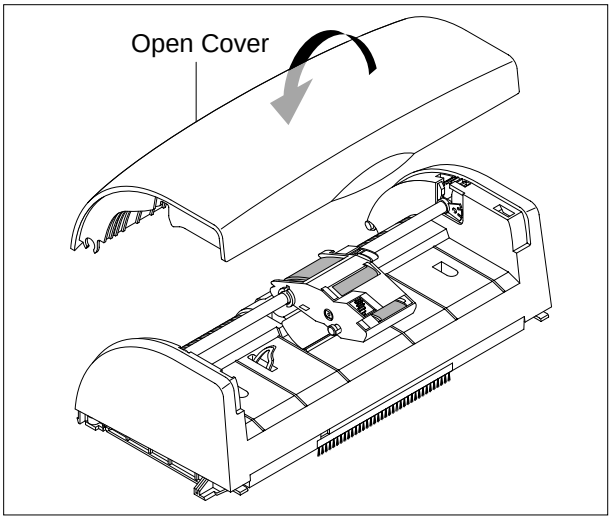
5-6 ADF Motor Ass'y

1. Before you remove the ADF Motor Ass'y, you should remove:
   - Rear Cover (see page 5-2)
   - Side Cover (LH, RH) (see page 5-3)
   - Scanner Ass'y (see page 5-5)

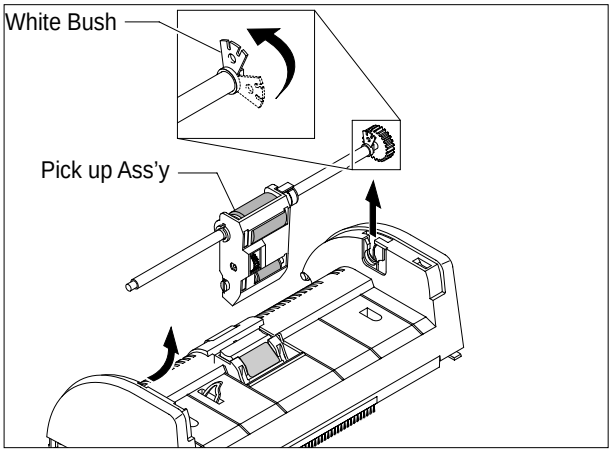
2. Remove the two screws securing the ADF Ass'y and remove it.



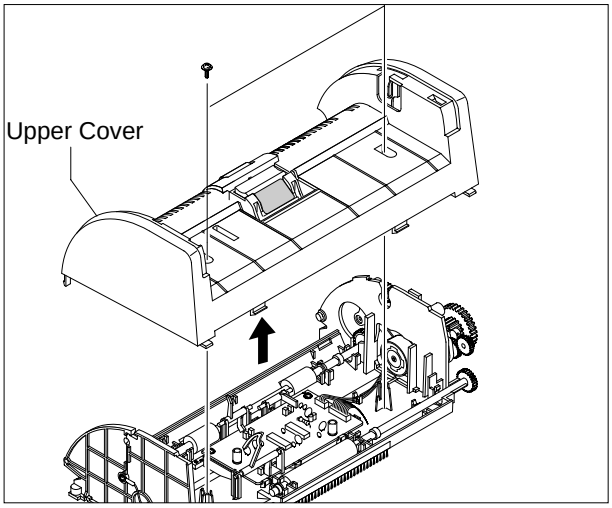
3. Remove the Open Cover, as shown below.



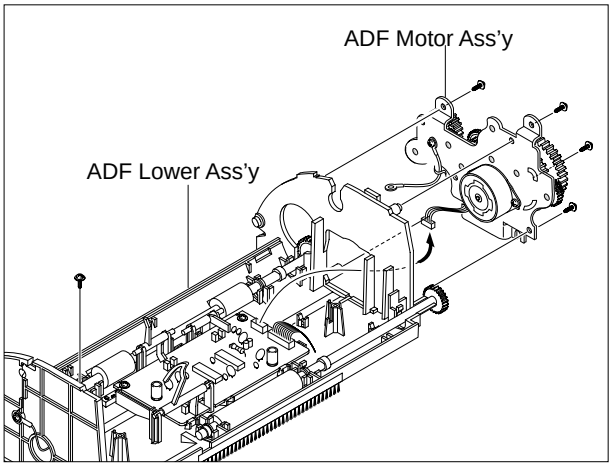
4. Pull the White Bush, then rotate it until reaches the slot, as shown below. Then lift the Pick up Ass'y out.



5. Remove the two screws securing the Upper Cover and remove it, as shown below.



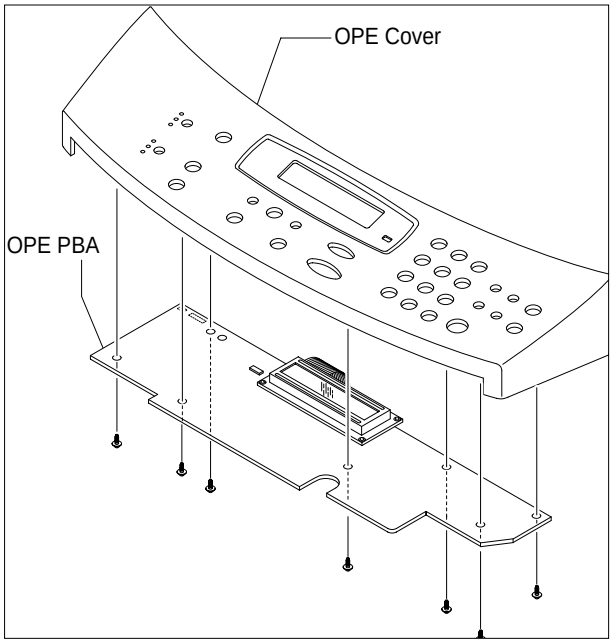
6. Unplug the one connector and remove four screws securing the ADF Motor Ass'y. Then take out the ADF Motor Ass'y.



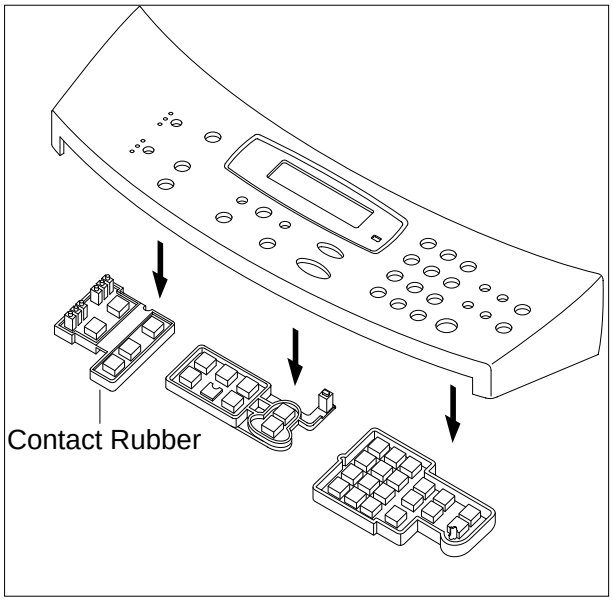
5-7 OPE Unit

1. Before you remove the OPE Unit, you should remove:
   - Rear Cover (see page 5-2)
   - Side Cover (LH, RH) (see page 5-3)
   - Scanner Ass'y (see page 5-5)

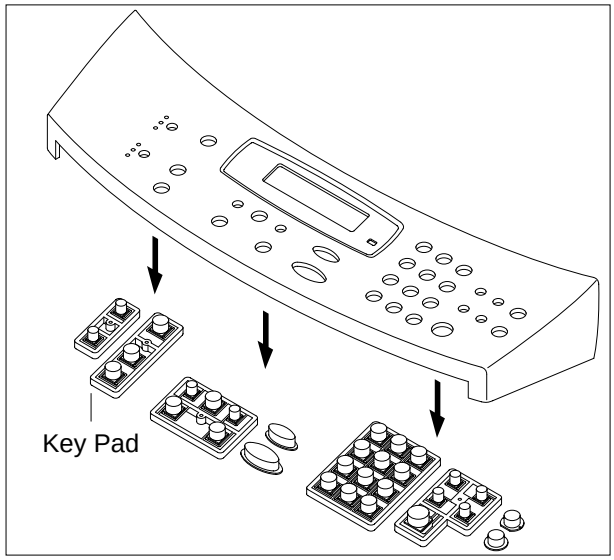
2. Remove the six screws securing the OPE PBA from the OPE Cover.



3. Remove the Contact Rubber from the OPE Cover.



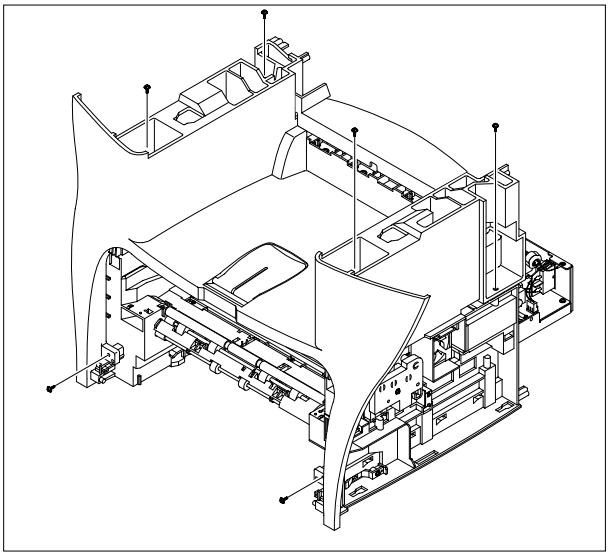
4. Remove the Key Pad from the OPE Cover.



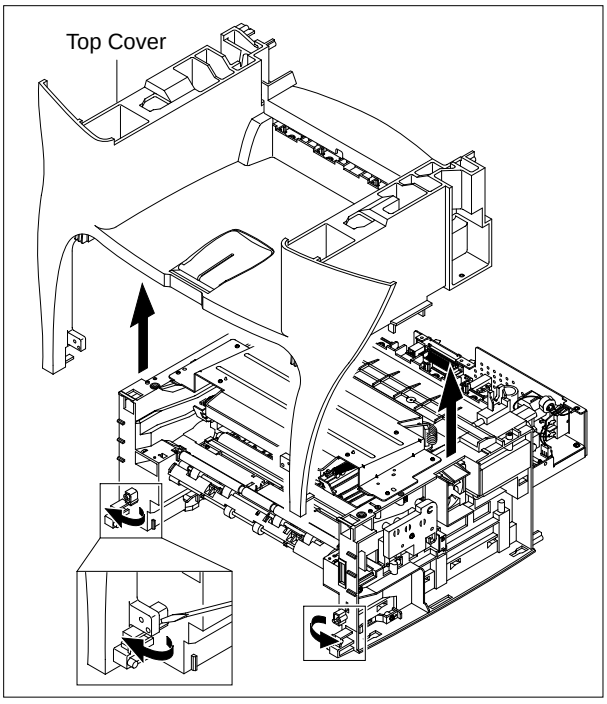
5-8 Middle Cover & Exit Roller

1. Before you remove the Exit Roller, you should remove:
   - Rear Cover (see page 5-2)
   - Front Cover Ass'y (see page 5-4)
   - Side Cover (LH, RH) (see page 5-3)
   - Scanner Ass'y (see page 5-5)

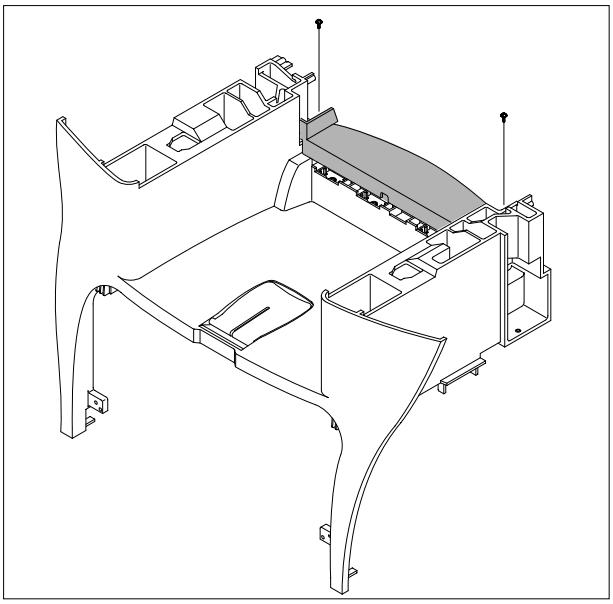
2. Remove the six screws securing the Top Cover and remove it.



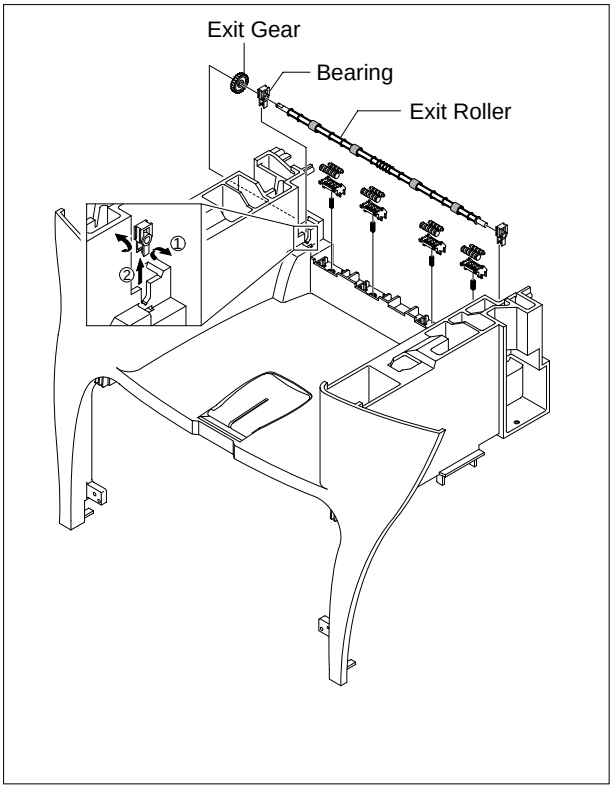
3. Unlatch the Top Cover Securing the Frame Ass'y, using a proper tool as shown below. Then lift the Top Cover out.



4. Remove the two screws securing the Cover-Rear Upper, as shown below



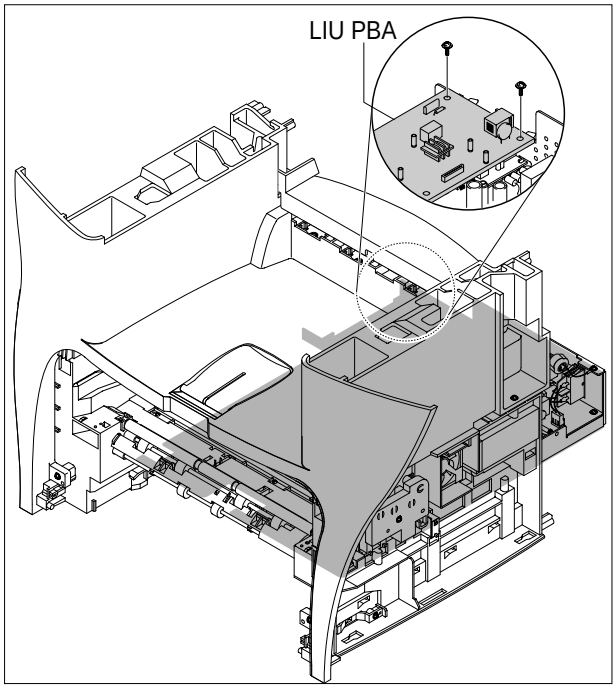
.5. Remove the Exit Gear and Bearing, as shown below.



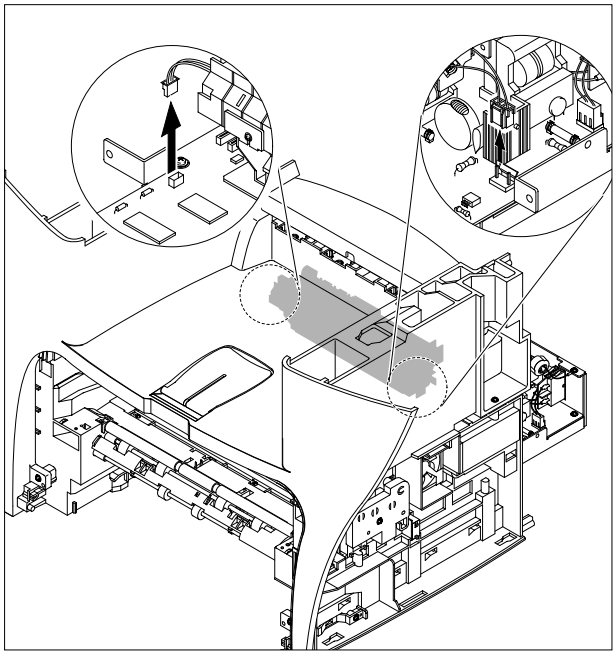
5-9 Engine Shield Ass'y

1. Before you remove the Engine Shield Ass'y, you should remove:
   - Rear Cover (see page 5-2)
   - Side Cover(LH, RH) (see page 5-3)
   - Scanner (see page 5-5)

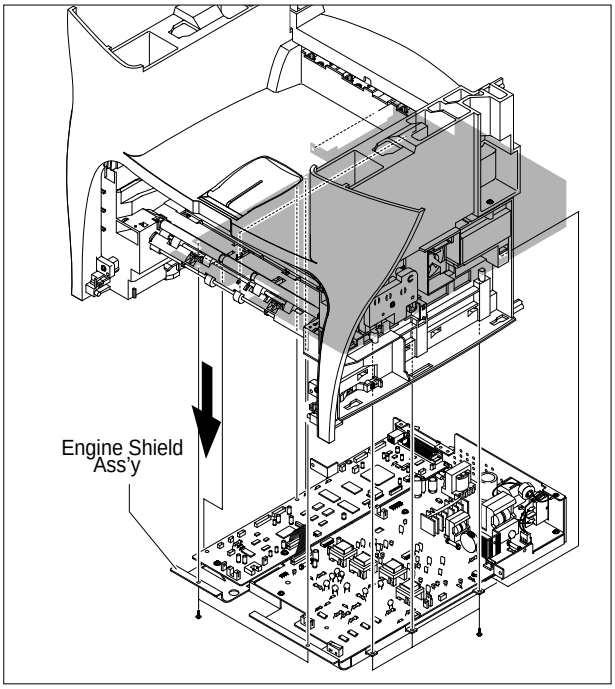
2. Remove the two screws securing and unplug the FPC cabble From the Main PBA.. Then reomve the LIU PBA



2. Unplug two connector



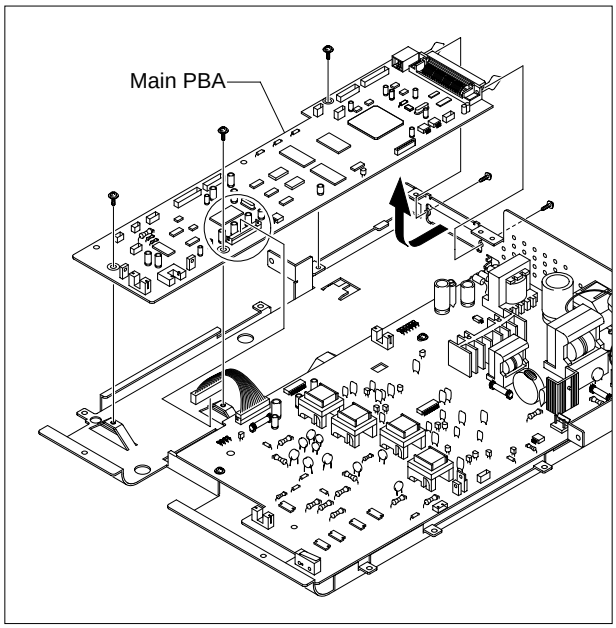
2. Remove the ten screws securing the Engine Shield Ass'y and remove it. Then unplug the all connectors from the Main PBA and SMPS.



5-10 Main PBA

1. Before you remove the Main PBA, you should remove:
   - Rear Cover (see page 5-2)
   - Side Cover(LH, RH) (see page 5-3)
   - Scanner (see page 5-5)
   - Engine Shield Ass'y(see page 5-10)

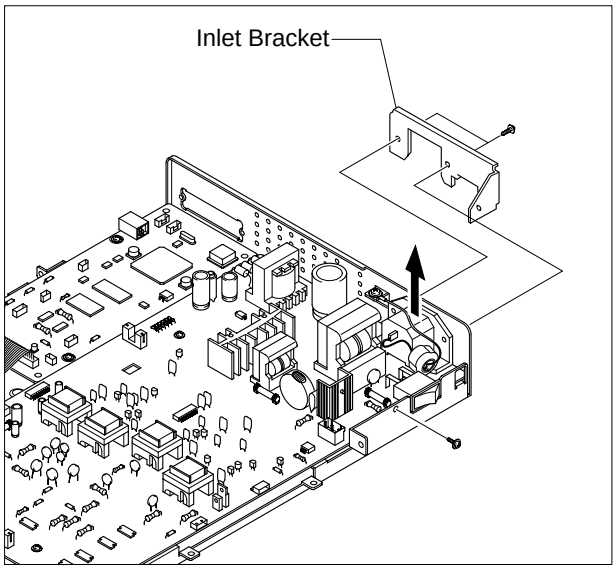
2. Unplug the one connector and remove the five screws securing the Main PBA. Then lift the Main PBA out, as shown below.



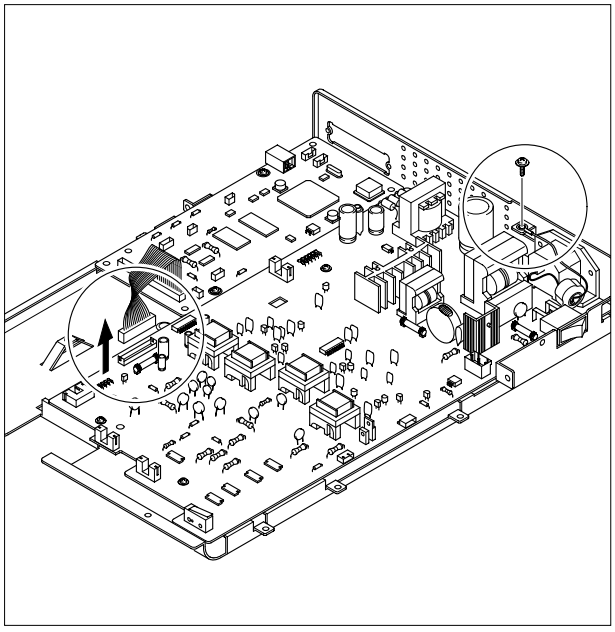
5-11 SMPS

1. Before you remove the SMPS, you should remove:
   - Rear Cover (see page 5-2)
   - Side Cover(LH, RH) (see page 5-3)
   - Scanner Ass'y (see page 5-5)
   - Engine Shield Ass'y(see page 5-12)

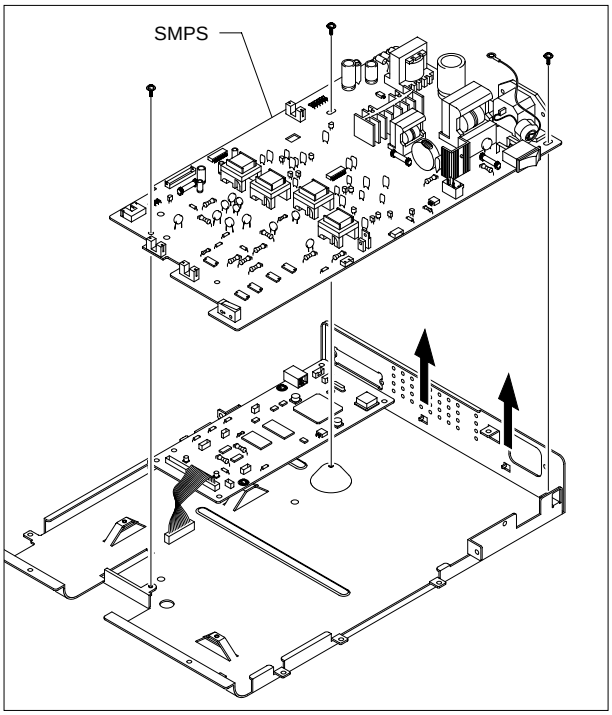
2. Remove the three screws securing the Inlet Bracket and remove it



2. Unplug the one connector and remove the one screw securing the Engine Shield.



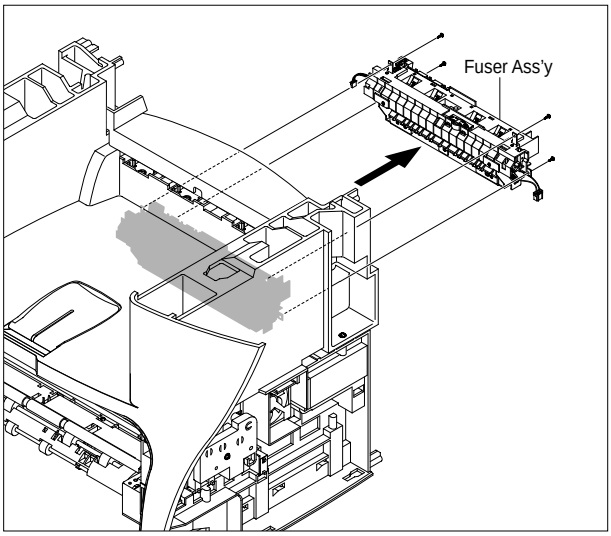
4. Rremove the three screws securing the SMPS. Then lift the SMPS out, as shown below.



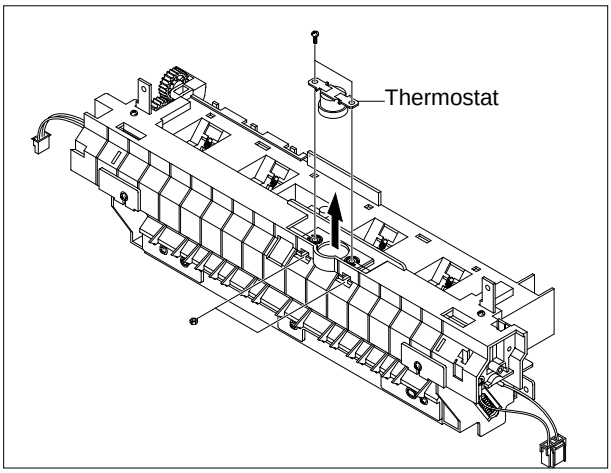
5-12 Fuser Ass'y

1. Before you remove the Fuser Ass'y, you should remove:
   - Rear Cover (see page 5-2)
   - Side Cover(LH, RH) (see page 5-3)
   - Scanner Ass'y (see page 5-5)
   - Engine Shield Ass'y(see page 5-12)

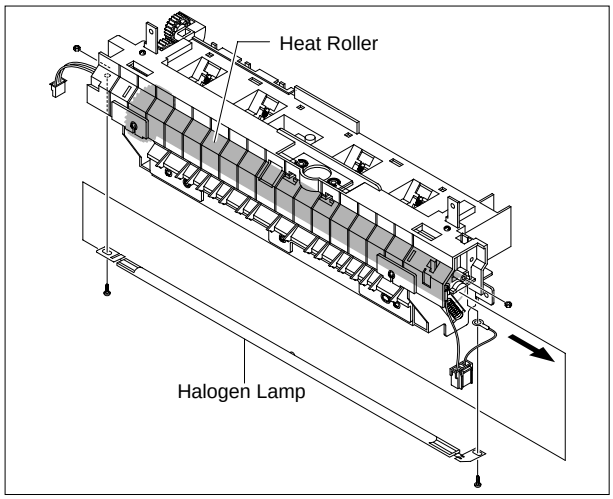
2. Unplug the two connectors from the Main PBA and SMPS, as shown below. Then remove the four screws securing the Fuser Ass'y and remove it.



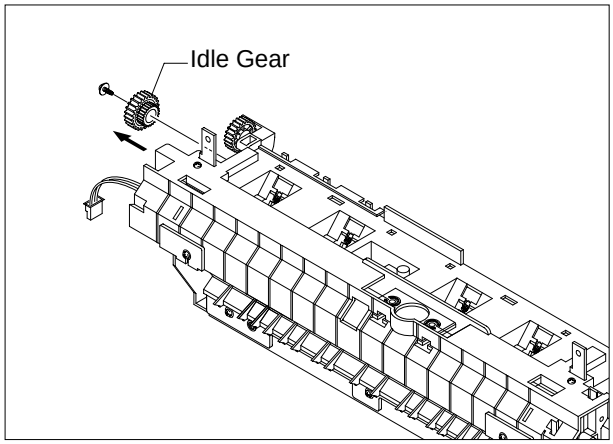
3. Remove the two screws securing the Thermostat. Then lift the Thermostat out



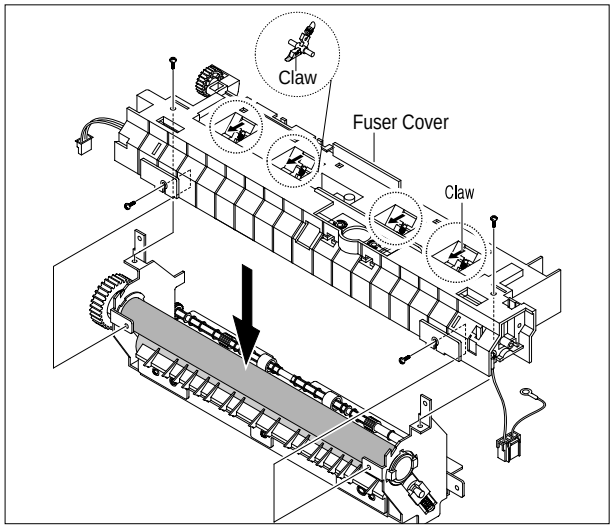
4. Remove the two screws securing the Halogen Lamp. Then take out the Halogen Lamp from the Heat



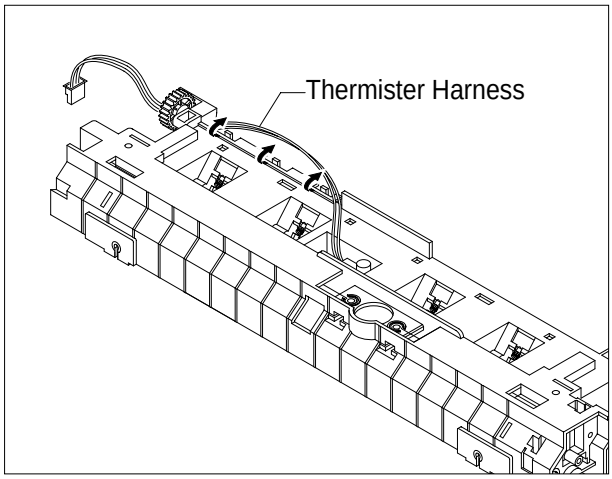
5. Remove the one screw securing the Idle Gear and remove it.



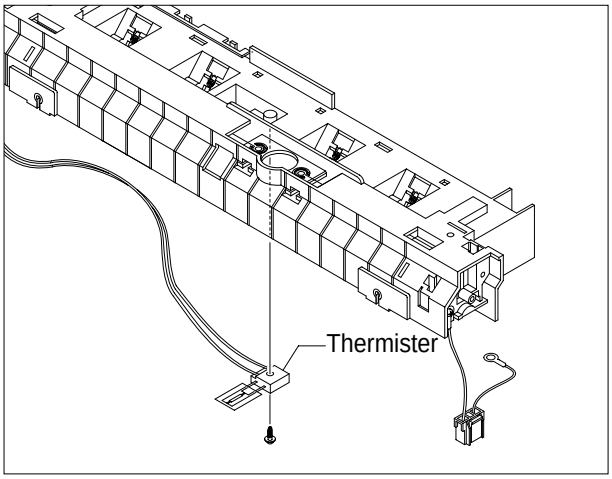
6. Remove the four screws securing the Fuser Cover and remove it, as shown below.



7. Unwrap the Thermister Harness, as shown below.



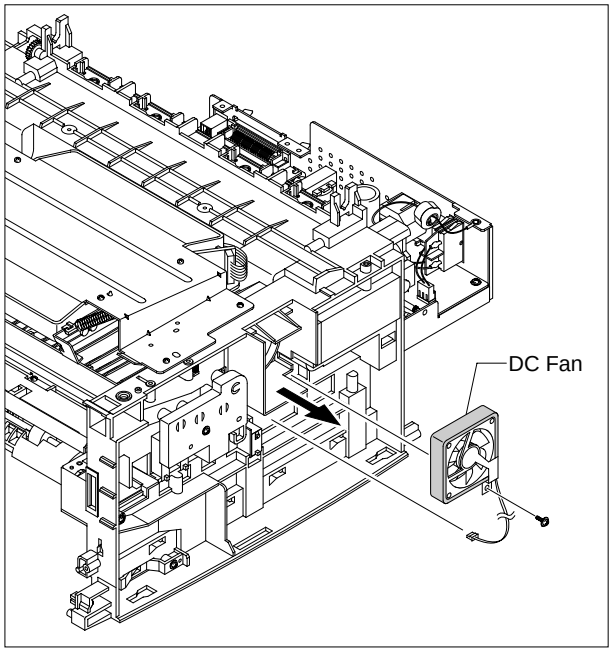
8. Remove the one screw securing the Thermister and remove it, as shown below.



5-13 Fan

1. Before you remove the Fan, you should remove:
   - Rear Cover (see page 5-2)
   - Side Cover (RH) (see page 5-3)

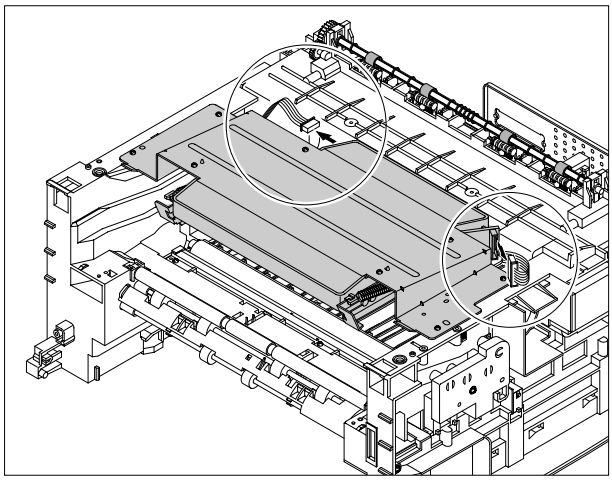
2. Unplug the connector from the SMPS and remove the one screw. Then take out the Fan.



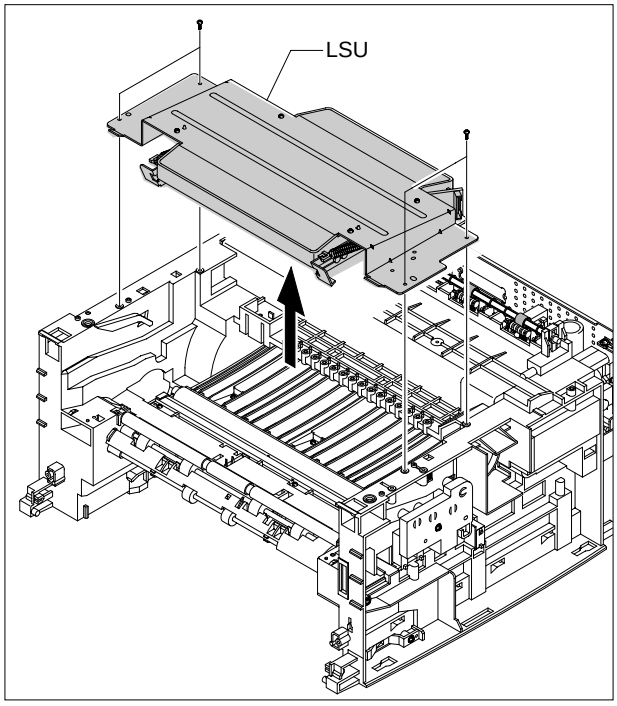
5-14 LSU

1. Before you remove the LSU, you should remove:
   - Rear Cover (see page 5-2)
   - Side Cover (LH, RH) (see page 5-3)
   - Scanner Ass'y (see page 5-5)
   - Front Cover (see page 5-4)
   - Middle Cover (see page 5-11)

2. Unplug the two connectors.



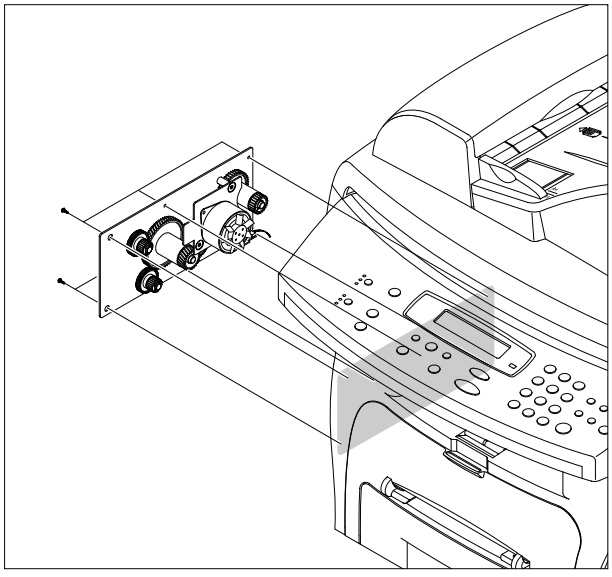
3. Remove the four screws securing the LSU and remove it.



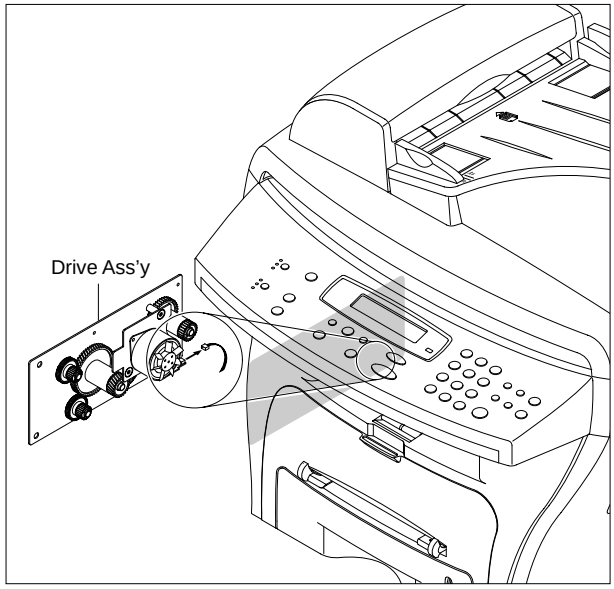
5-15 Drive Ass'y

1. Before you remove the Drive Ass'y, you should remove:
   - Rear Cover (see page 5-2)
   - Side Cover (LH) (see page 5-3)

2. Remove the six screws securing the Drive Ass'y.



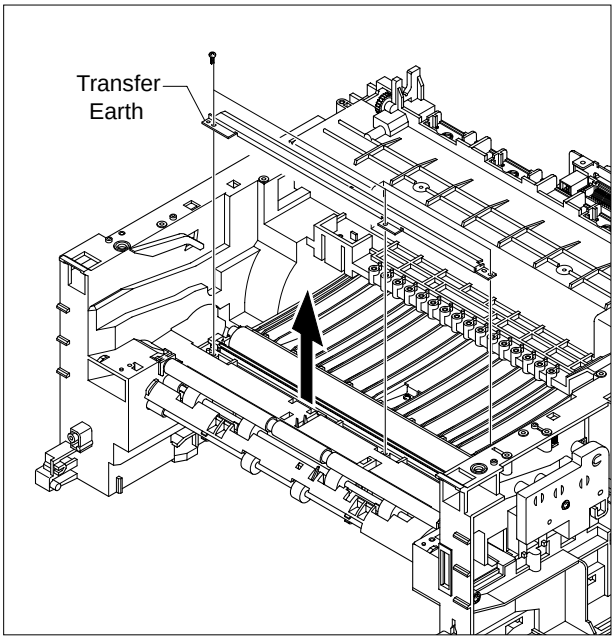
3. Take out the Drive Ass'y, then unplug the connector from the Main PBA, as shown below.



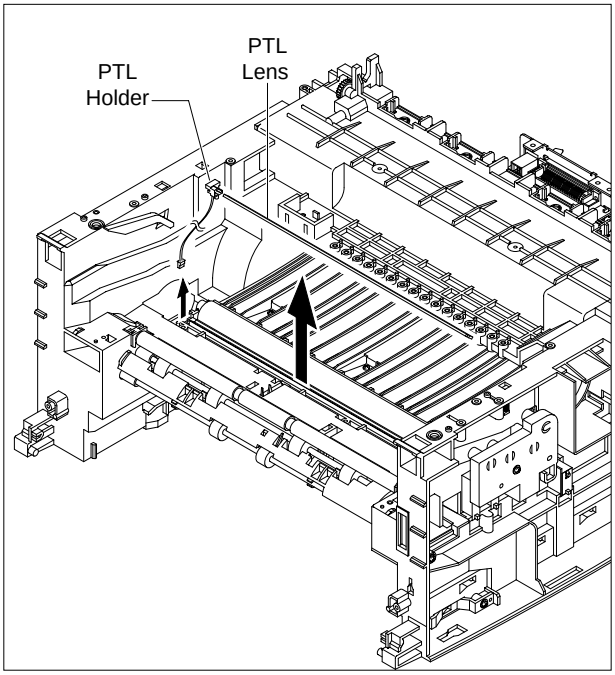
5-16 Transfer Ass'y

1. Before you remove the Transfer Ass'y, you should remove:
   - Rear Cover (see page 5-2)
   - Side Cover (LH, RH) (see page 5-3)
   - Scanner Ass'y (see page 5-5)
   - Front Cover (see page 5-4)
   - Middle Cover (see page 5-11)
   - LSU (see page 5-18)

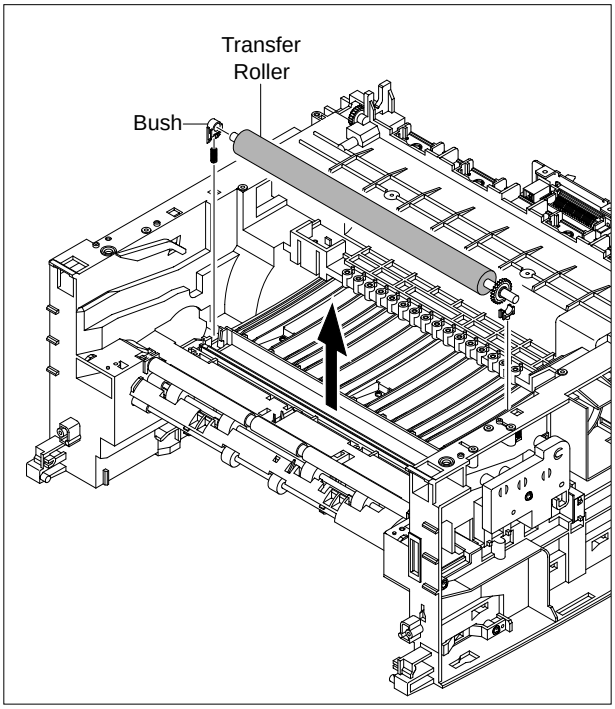
2. Remove the three screws securing the Transfer Earth and remove it.



3. Unplug the PTL Holder connector, then remove the PTL Holder and PTL Lens, as shown below.



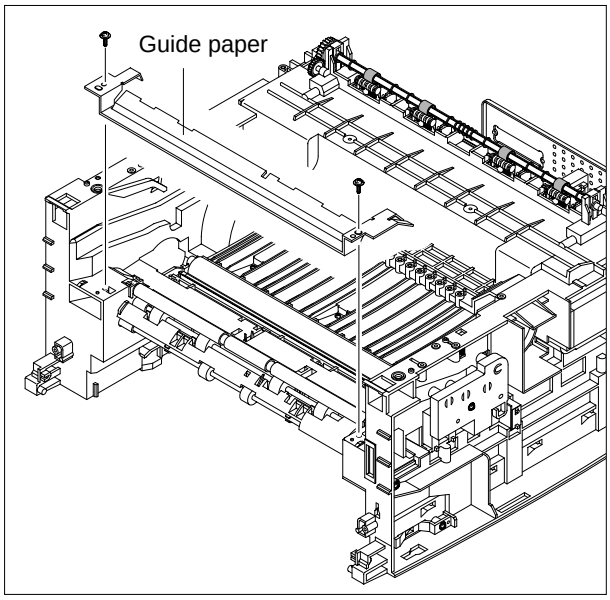
4. Unlatch the Bush and remove it. Then lift the Transfer Roller out, as shown below.



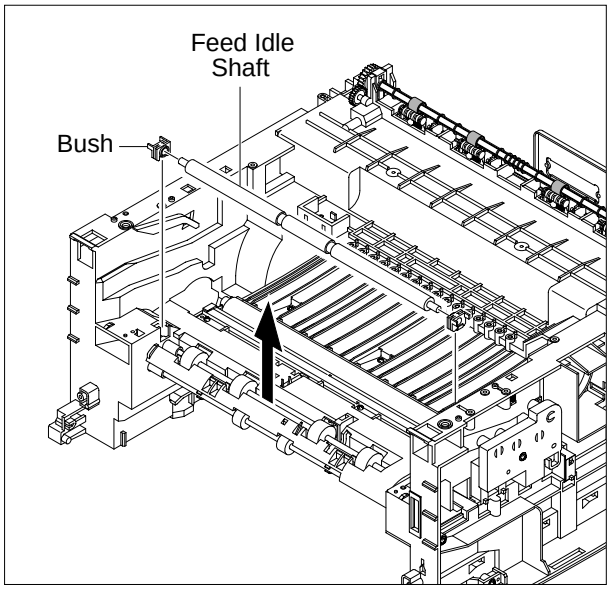
5-17 Feed Ass'y

1. Before you remove the Feed Ass'y, you should remove:
   - Rear Cover (see page 5-2)
   - Side Cover (LH, RH) (see page 5-3)
   - Scanner Ass'y (see page 5-5)
   - Front Cover (see page 5-4)
   - Middle Cover (see page 5-11)
   - Drive Ass'y (see page 5-18)

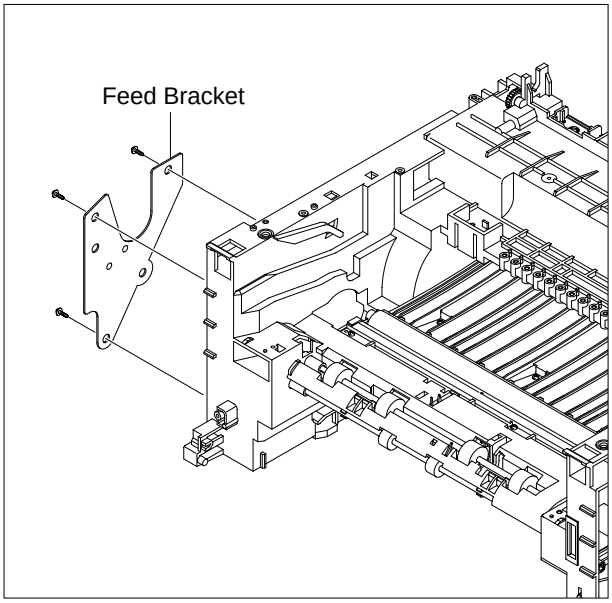
2. Remove the two screws securing the Guide Paper and remove it.



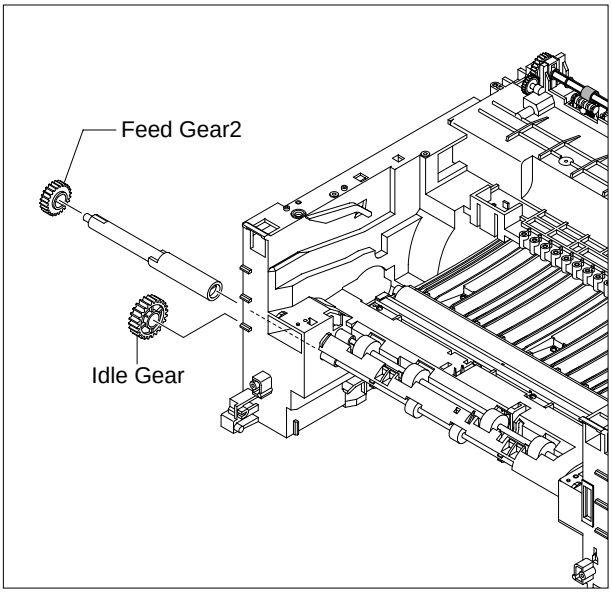
3. Pull up the Feed Idle Bush and Feed Idle Shaft, as shown below.



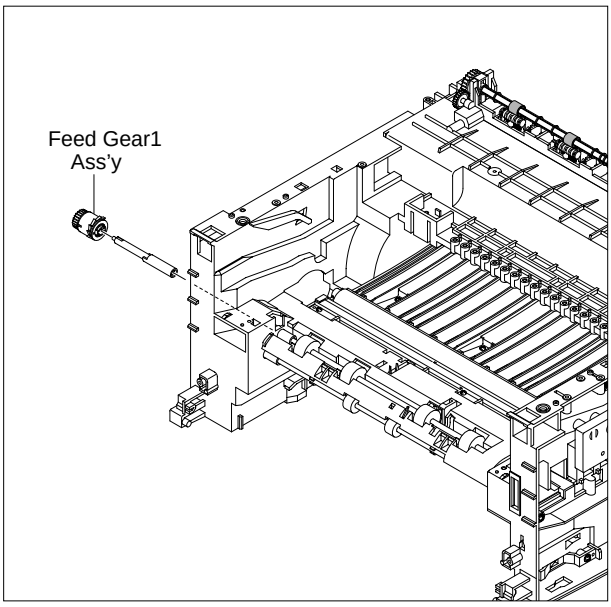
4. Remove the three screws securing the Feed Bracket and remove it.



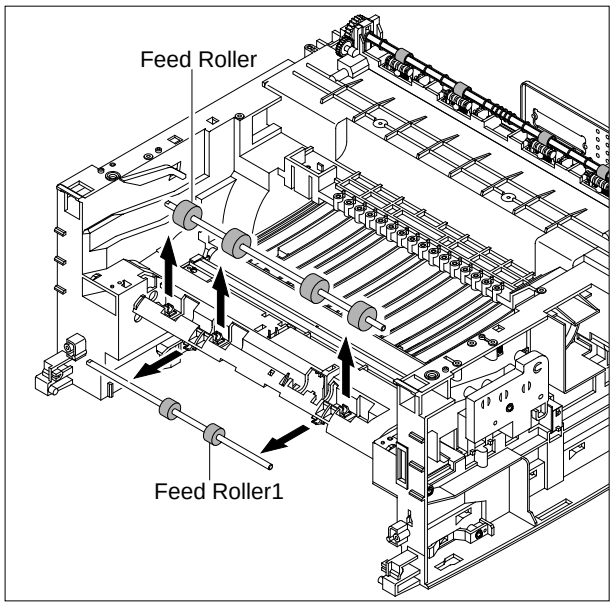
5. Remove the Idle Gear and Feed Gear2.



6. Remove the Feed Gear1 Ass'y.



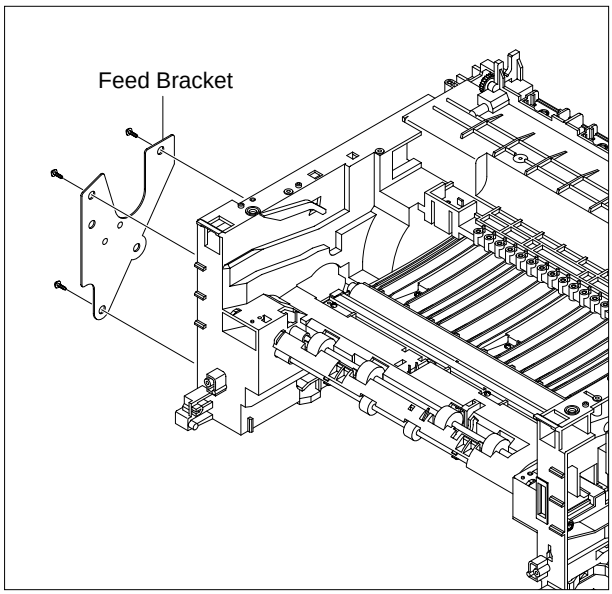
7. Pull up the Feed Roller and Feed Roller1.



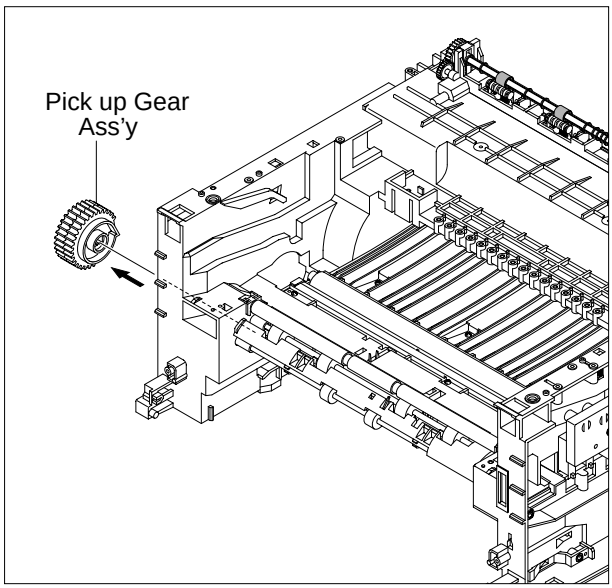
5-18 Pick up Ass'y & Solenoid

1. Before you remove the Pick up Ass'y, you should remove:
   - Rear Cover (see page 5-2)
   - Side Cover (LH, RH) (see page 5-3)
   - Front Cover (see page 5-4)
   - Scanner Ass'y (see page 5-5)
   - Middle Cover (see page 5-11)
   - Engine Shield Ass,y (see page 5-12)
   - Drive Ass'y (see page 5-18)

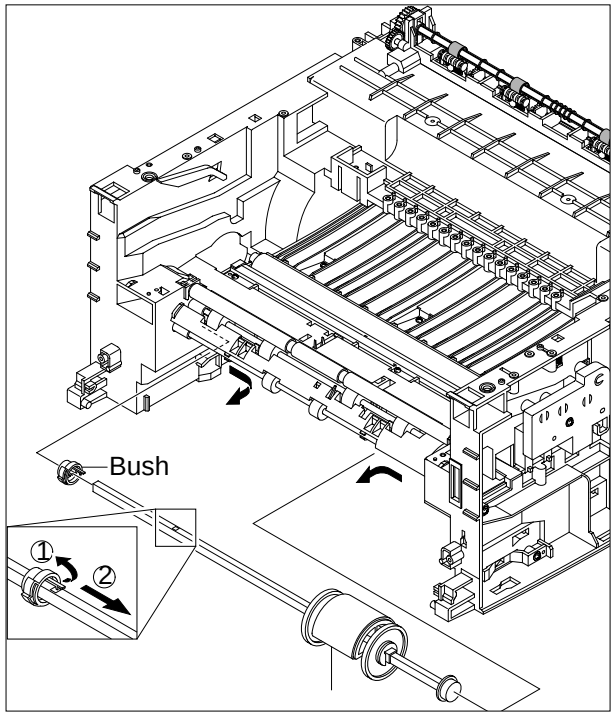
2. Remove the three screws securing the Feed Bracket and remove it.



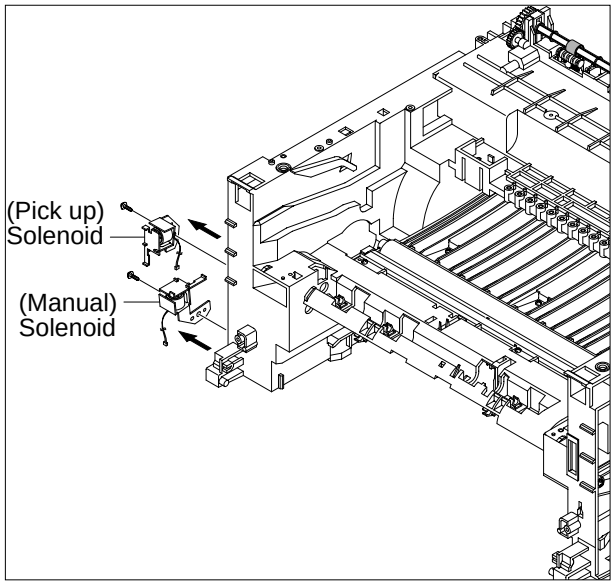
3. Remove the Pick up Gear Ass,y.



4. Take out the Pick up Ass'y, as shown below.



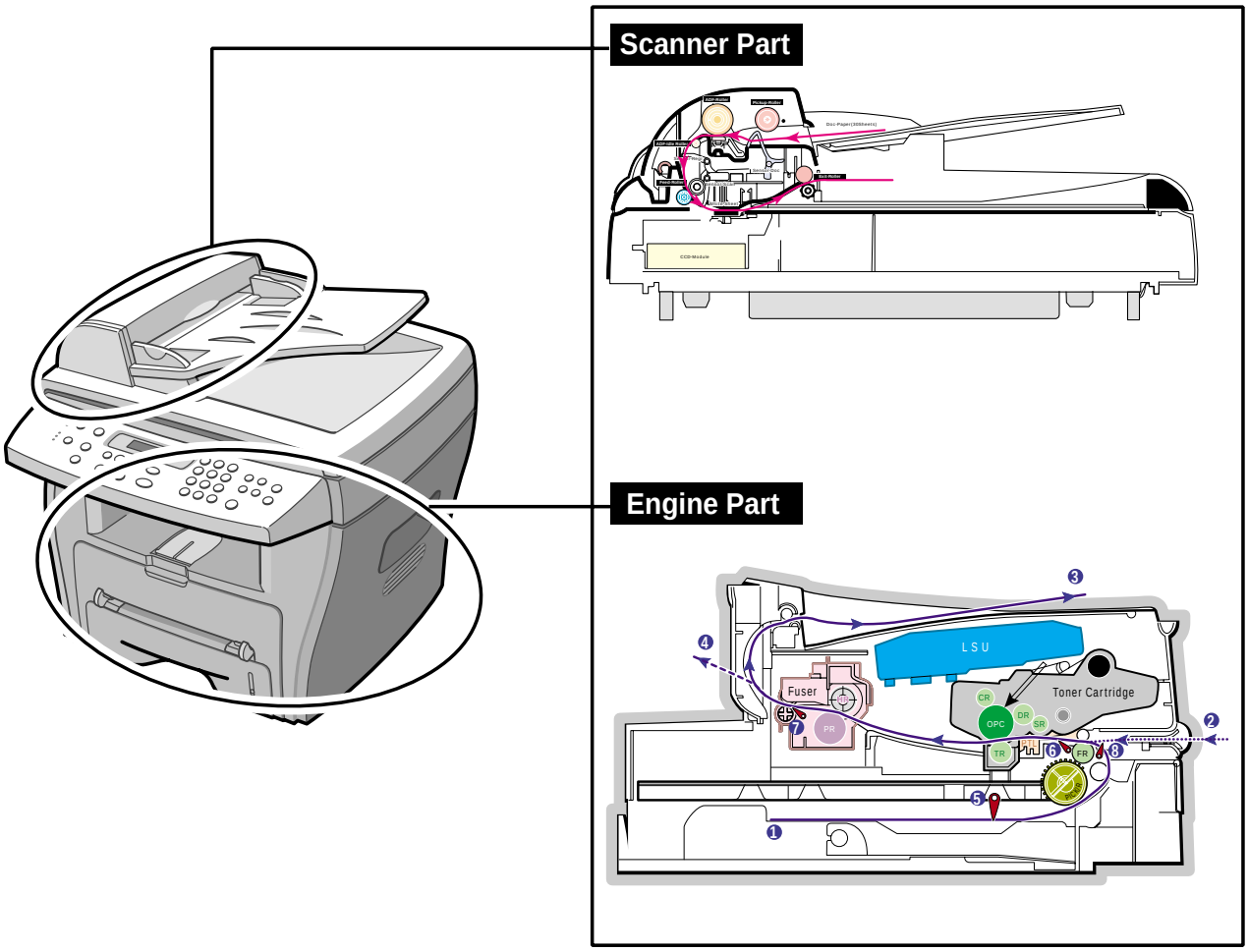
5. Remove the two screws securing the Manual Solenoid and Pick up Solenoid. Then remove Manual Solenoid and Pick up Solenoid.



6. Alignment and Adjustments

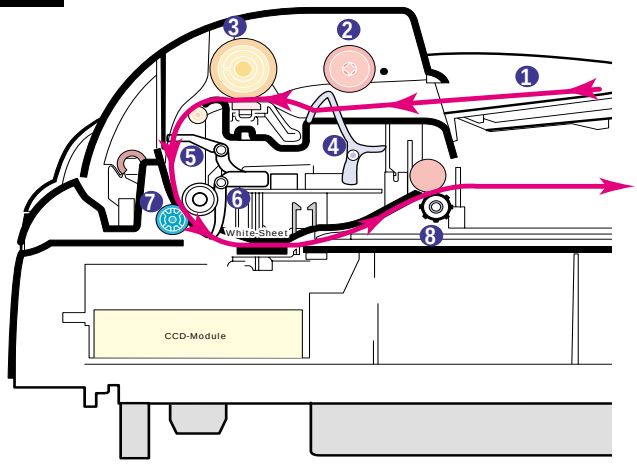
This chapter describes the main functions for service, such as the product maintenance method, the test output related to maintenance and repair, DCU using method, Jam removing method, and so on.

6.1 Paper path



6.1.1 Copy & Scan Document Path

Scanner Part

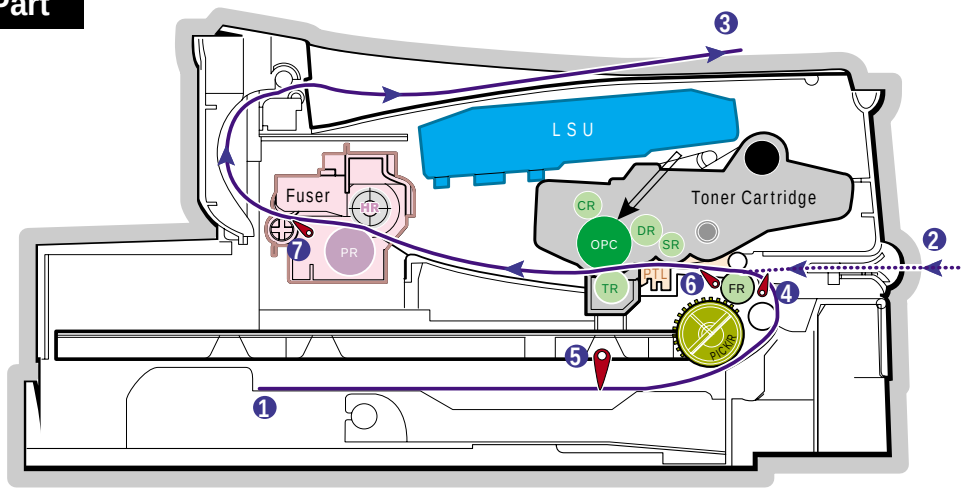


1. Doc. Paper (30 Sheets)
2. Pickup Roller
3. ADF Roller
4. Sensor - Doc.
5. Sensor - Regi
6. Sensor - Scan
7. Feed Roller
8. Exit Roller

6.1.2 Printer Paper Path

1) After receiving print job, the printer feeds the printing paper from the cassette or manual feeder.
2) The fed paper passes the paper feeding sensor. (Jam 0 occurs if the sensor is not operated after certain time passes)
3) The paper passes the paper feeding sensor moving to the paper exit sensor via printing process. (Jam 1 occurs if the sensor is not operated after a certain time passes)
4) The paper passed the paper exit sensor moving out from the set. (Jam 2 occurs if the sensor is still operated after a certain time passes.)

Engine Part



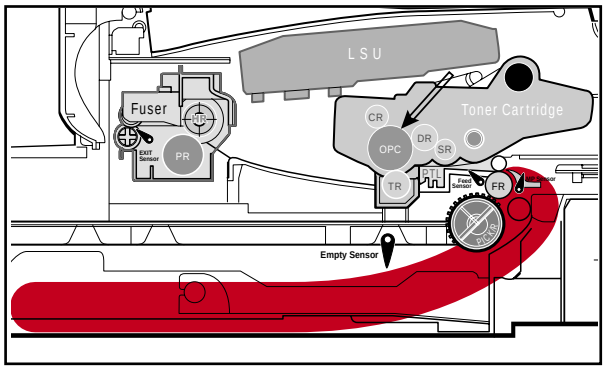
1. Paper Input (Cassette)
2. Paper Input (Manual Feeder)
3. Paper Out (Face Down)
4. Paper Empty Sensor (Manual)
5. Paper Empty Sensor (Cassette)
6. Paper Feeding Sensor
7. Paper Exit Sensor

6.2 Clearing Paper Jams

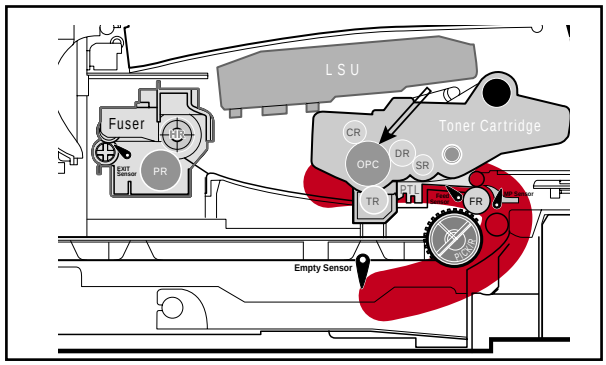
Occasionally, paper can be jammed during a print job. Some of the causes include:

- The tray is loaded improperly or overfilled.
- The tray has been pulled out during a print job.
- The front cover has been opened during a print job.
- Paper was used that does not meet paper specifications.
- Paper that is outside of the supported size range was used.

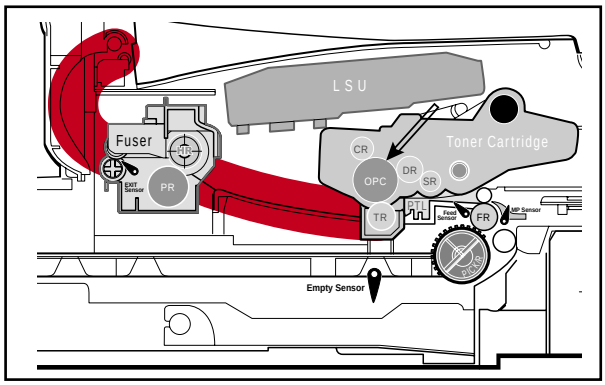
If a paper jam occurs, the On Line/Error LED on the control panel lights red. Find and remove the jammed paper. If you don't see the paper, open the covers.
Do not use a tweezers or a sharp metal tool when removing a jam.
The covering of a metal part can be removed which can cause an electric leakage.



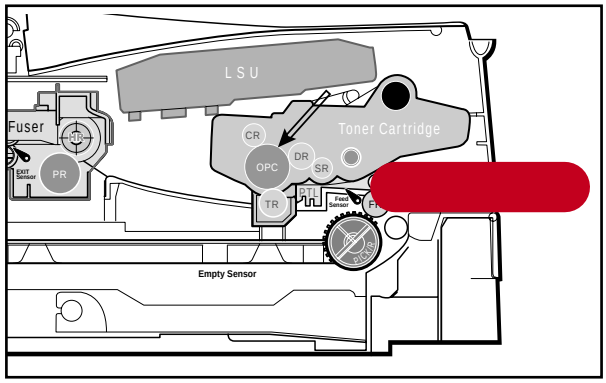
Paper Jam0



Paper Jam1



Paper Jam2



Bypass Jam

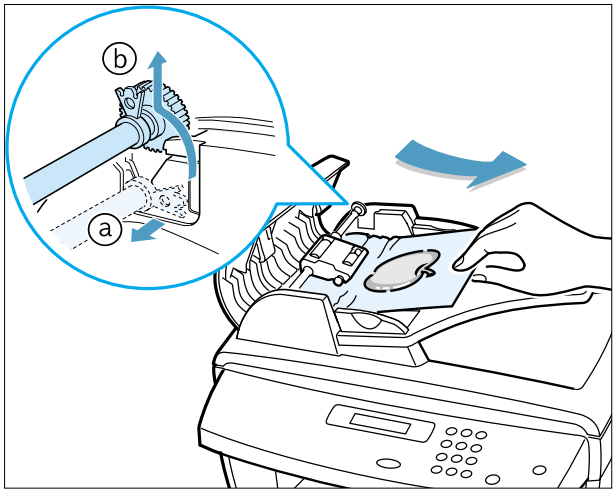
6.2.1 Clearing Document Jams

If a document jams while it is feeding through the ADF (Automatic Document Feeder),“DOCUMENT JAM ” appears on the display.

6.2.1.1 Input Misfeed

1) Open the ADF top cover.

2) Pull the document gently to the right and out of the ADF.



3) Close the ADF top cover.Then load the documents back into the ADF.

NOTE : *To prevent document jams,use the document glass for the thick,thin or mixed documents.*

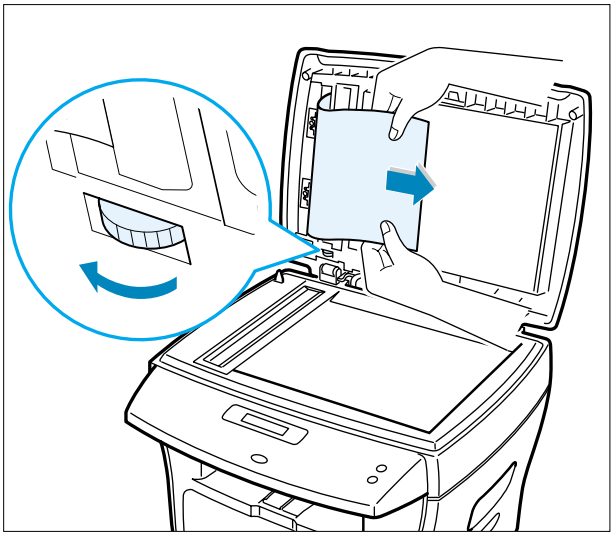
6.2.1.2 Exit Misfeed

1) Open the document cover and turn the release knob to remove the misfed documents from the exit area.

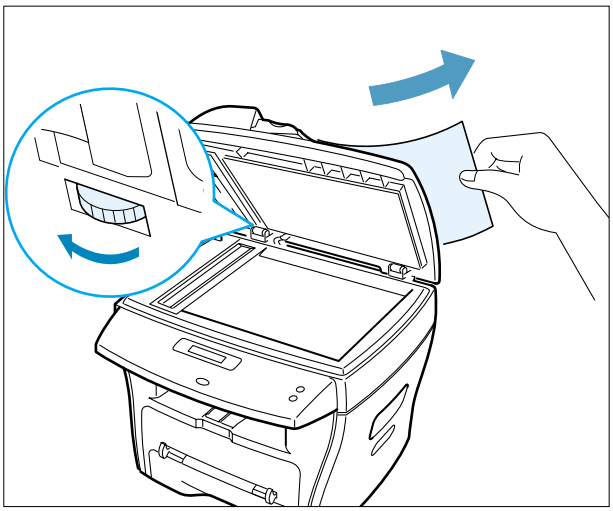
2) Close the document cover.Then load the documents back into the ADF.

6.2.1.3 Roller Misfeed

1) Open the document cover.



2) Turn the release knob so that you can easily remove the misfed document,and remove the document from the ADF or the feed area by carefully pulling it towards the right by using both hands.



3) Close the document cover.Then load the documents back into the ADF.

6.2.2 Clearing Paper Jams

If paper jams occur,"PAPER JAM " appears on the display. Refer to the table below to locate and clear the paper jam.

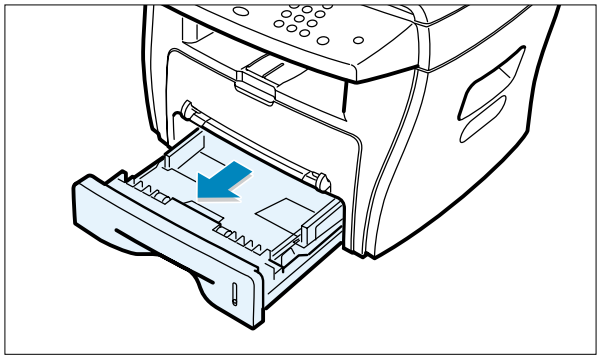
PAPER JAM 0	: In the paper feed area
PAPER JAM 2	: In the paper exit area
PAPER JAM 1	: In the fuser area or around the toner cartridge
BYPASS JAM	: In the Bypass tray

Follow the steps below to clear a jam.To avoid tearing the paper, pull the jammed paper out gently and slowly.

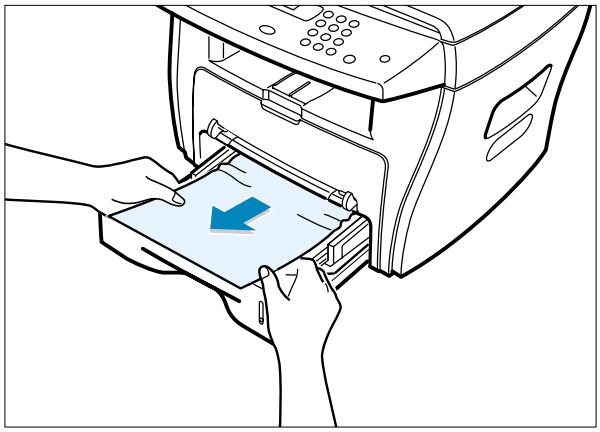
6.2.2.1 JAM0 (In the Paper Feed Area)

1) Open and close the front cover.The jammed paper automatically exits the machine.
If the paper does not exit,continue to Step 2.

2 Pull the paper tray open.

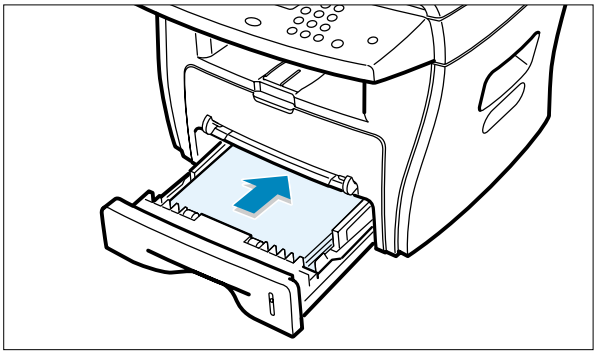


3) Remove the jammed paper by gently pulling it straight out.



If there is any resistance when you pull the paper or the paper is not seen in this area,skip to the fuser area around the toner cartridge

4) Insert the paper tray into the machine until it snaps into place.

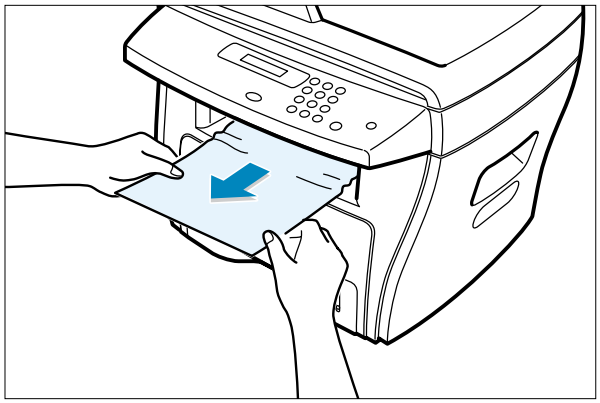


5) Open and close the front cover to resume printing.

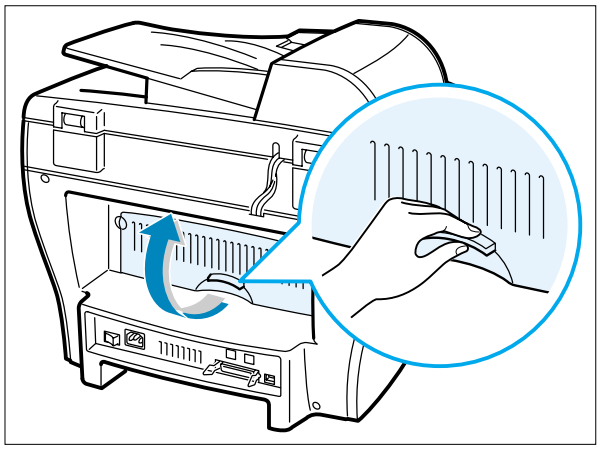
6.2.2.2 JAM 2 (In the Paper Exit Area)

1) Open and close the front cover.The jammed paper automatically exits the machine.
If the paper does not exit,continue to Step 2.

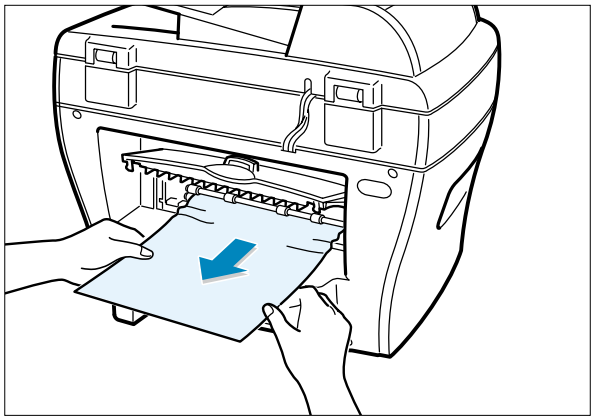
2) Gently pull the paper out of the front output tray.



3) If there is any resistance when you pull the paper or the paper is not seen in the front output tray,open the rear cover.



4) Remove the jammed paper by gently pulling it straight out.



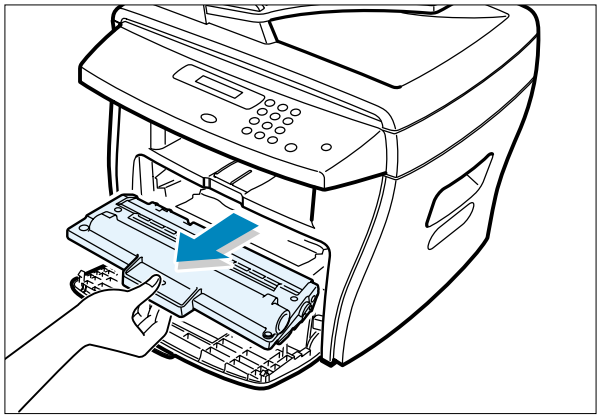
5) Close the rear cover.

6) Open and close the front cover to resume printing.

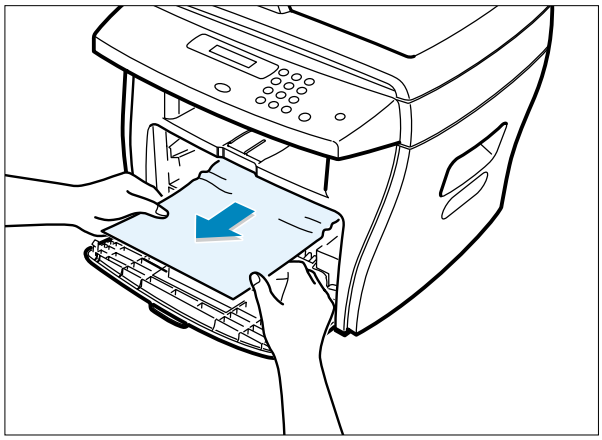
6.2.2.3 JAM1 (In the Fuser Area of Around the Toner Cartridge Area)

NOTE : The fuser area is hot.Be careful when removing paper from the machine.

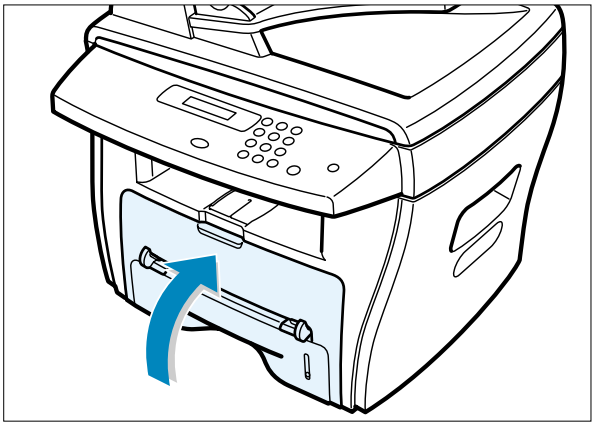
1) Open the front cover and remove the toner cartridge.



2) Remove the jammed paper by gently pulling it straight out.



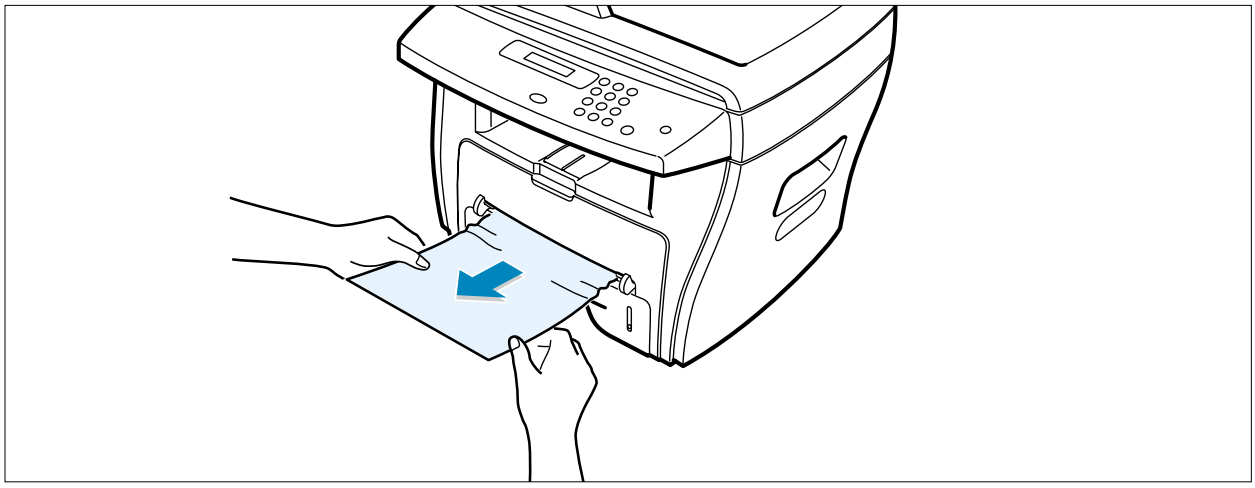
3) Replace the toner cartridge and close the front cover. Printing automatically resumes.



6.2.2.4 BYPASS JAM (In the Bypass Tray)

“BYPASS JAM ” appears on the display when the machine does not detect paper in the Bypass tray due to no paper or improper paper loading when you try to print using the Bypass tray.

“BYPASS JAM ” also may occur when the paper is not properly fed into the machine through the Bypass tray.In that case,pull the paper out of the machine.



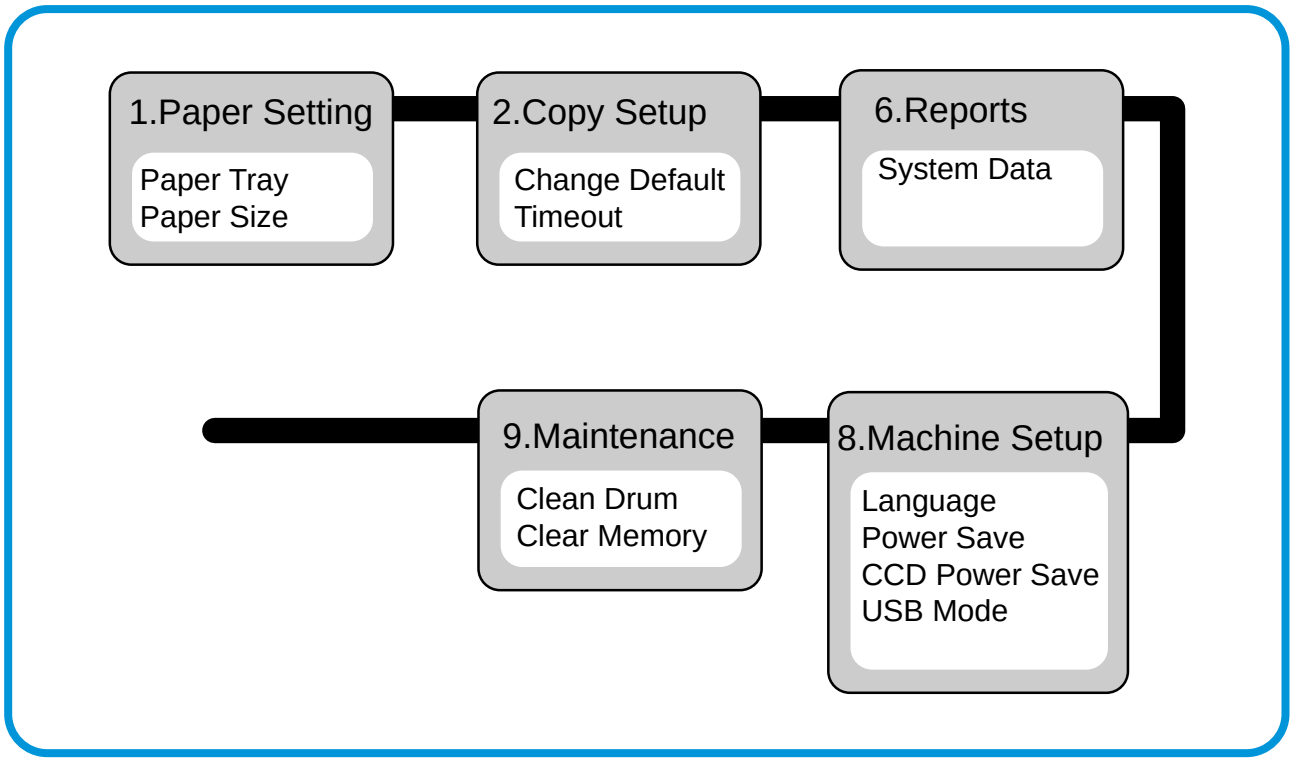
6.2.2.5 Tips for Avoiding Paper Jams

By selecting the correct paper types,most paper jams can be avoided. If a paper jam occurs, follow the steps outlined in “Clearing Paper Jams ”

- Follow the procedures in “Loading Paper ” .Ensure that the adjustable guides are positioned correctly.
- Do not overload the paper tray.Ensure that the paper is below the paper capacity mark on the inside wall of the paper tray.
- Do not remove the paper from the tray while printing.
- Flex, fan and straighten the paper before loading.
- Do not use creased, damp or highly curled paper.
- Do not mix paper types in the paper tray.
- Use only recommended print materials. See “Paper Specifications ”
- Ensure that the recommended print side is facing down when loading paper in the paper tray and facing up in the Bypass tray.

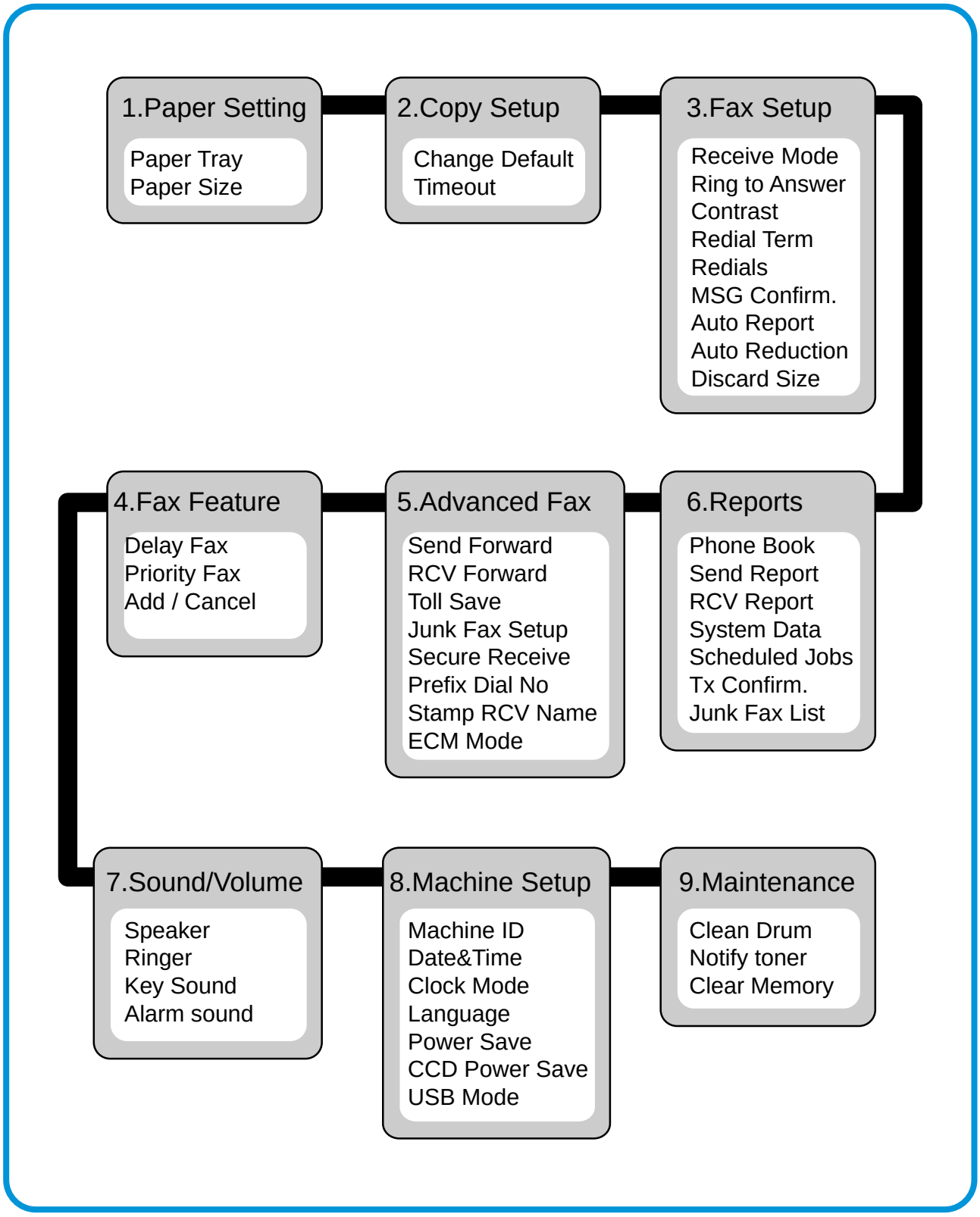
6.3 User Mode(SCX-4116 & SCX-4016)

The table in the bellow explains the possible setting functions by user. The details about the ways to use are explained in the user manual.
In the service manual, the items are about the possible set-up by user.



6.3 User Mode

The table in the bellow explains the possible setting functions by user. The details about the ways to use are explained in the user manual.
In the service manual, the items are about the possible set-up by user.



6.4 Tech Mode

6.4.1 How to Enter Tech Mode

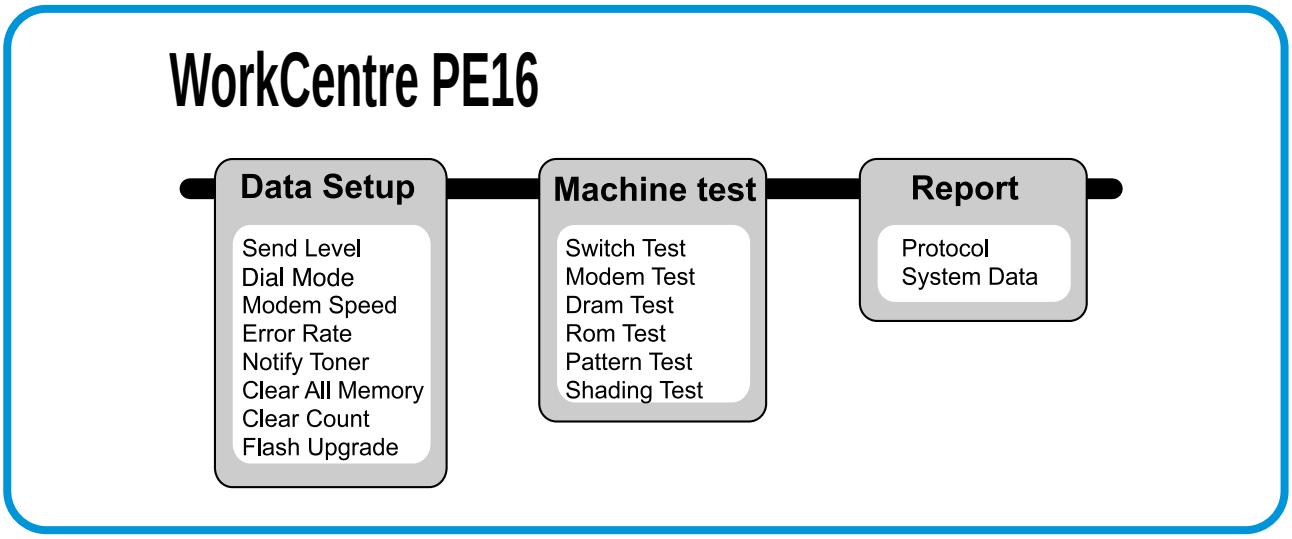
In service (tech) mode, the technician can check the machine and perform various test to isolate the cause of a malfunction.

While in Tech mode, the machine still performs all normal operations.

To enter the Tech mode

To enter the Tech mode, press Menu → # → 1 → 9 → 3 → 4 in sequence, and the LCD briefly displays **'TECH',** the machine has entered service (tech) mode.

6.4.2 Setting-up System in Tech Mode



6.4.3 Data Setup

SEND LEVEL

You can set the level of the transmission signal. Typically, the Tx level should be under -12 dBm.

Caution : *The Send Fax Level is set at the best condition in the shipment from factory. Never change settings arbitrarily.*

DIAL MODE

This function can choose dial method.
*Default : Dial(Tone/Pulse)

MODEM SPEED

You can set the maximum modem speed.
Communication is done with modem speed automatically set at lower speed when communicating with a slower speed modem since communication is done on the standard of the side where modem speed is low for transmission/reception. It is best set 33.6Kbps as default setting.

ERROR RATE

When the error rate is about exceed the set value, the Baud rate automatically adjusts to 2400 bps.
This ensures that the error rate remains below the set value.
You can select the rate between 5% and 10%.

CLEAR ALL MEMORY

The function resets the system to factory default settings.
This function is used to reset the system to the initial value when the product is functioning abnormally . All the values are returned to the default values, and all the information, which was set by the user, will be erased.

< Method >

1. Select the [MEMORY CLEAR] at the TECH MODE.
2. Push the ENTER button.
3. Select you country. (There are four country groups. Refer to the table below.)
4. Push the ENTER button then it will clear all memory.

NOTICE : *Always perform a memory clear after replacing the main board. Otherwise, the system may not operate properly.*

Country Group	USA/Canada	UK	Russia	Southafrica
Country	USA/Canada Mexico Brazil	UK Germany France Italy Spain Austria Netherlands Belgium Portugal Sweden Norway Denmark Finland Switzerland Greece Ireland Turkey	Russia india Oman Poland Bangladesh Kuwait Moroco Algeria Pakistan UAE Bahrain Srilanka SaudiArabia Chile Peru Argentina Hungary Romania Bulgaria Czech	Southafrica

FLASH UPGRADE

The Firmware Upgrade function and has two methods, Local and Remote.

(1) Local Machine

• RCP(Remote Control Panel) mode

This method is for Parallel Port.or USB Port Connect to PC and activate RCP(Remote Control Panel) to upgrade the Firmware.

< Method >

How to Update Firmware using RCP

1. Connect PC and Printer with Parallel Cable or USB Cable.
2. Execute RCP and select Firmware Update.
3. Search Firmware file to update with Browse Icon.
4. Click Update icon, firmware file is transmitted to Printer automatically and printer is initialized when it finished.
5. Click Refresh icon and check what is updated.

• DOS Command mode

This method is just for Parallel Port. Connect to PC with Parallel cable and enter DOS Command to upgrade the Firmware.

< Method >

1. The first of all, need the files : down.bat, down_com.bin, fprt.exe, and Rom File: file name for upgrade.Save the files in the same folder.
2. In the DOS, input as below and push the enter key. Then, it will be automatically upgraded.
3. There are two commands for the conditions of product.
   * When the product is in idle condition **down "rom file"**
   * When the product is in Ready condition (TECH MODE → MAINTENANCE→ FLASH UPGRADE→ LOCAL) **fprt "rom file"**
4. Do not turn off the power while upgrading process.

(2) Remote FAX

This is a function that a fax with the latest firmware sends files to a fax in long distance through telephone line.

< Method >

1. Operate a fax with the latest firmware to prepare it being upgrade.
   (TECH MODE → MAINTENANCE→ FLASH UPGRADE→ REMOTE)
2. Input the fax number, which needs to be upgraded.
   (Several faxes can be upgrade at the same time. In this case, enter the each fax number.)
3. After push the enter button, send the firmware file by calling to the appointed number.
   (Around 10~15 minutes needs to send the file.)

< Caution >

1. sending and receiving fax must be the same model.
2. A sending fax must be set up as ECM mode, and a receiving memory must be set up as 100%. If not, the function operates abnormally.

6.5.4 Machine Test

SWITCH TEST

Use this feature to test all keys on the operation control panel. The result is displayed on the LCD window each time you press a key.

MODEM TEST

Use this feature to hear various transmission signals to the telephone line from the modem and to check the modem. If no transmission signal sound is heard, it means the modem part of the main board malfunctioned.

DRAM TEST

Use this feature to test the machine's DRAM. The result appears in the LCD display.
If all memory is working normally, the LCD shows << O K >>

ROM TEST

Use this feature to test the machine'S ROM. The result and the software version appear in the LCD display.

- FLASH VER : 1.00 V
- ENGINE VER :1.00V

PATTERN TEST

Using this pattern printout, you can check if the printer mechanism is functioning properly.
It is needed in the production progress. Service person doesn't need to use it.

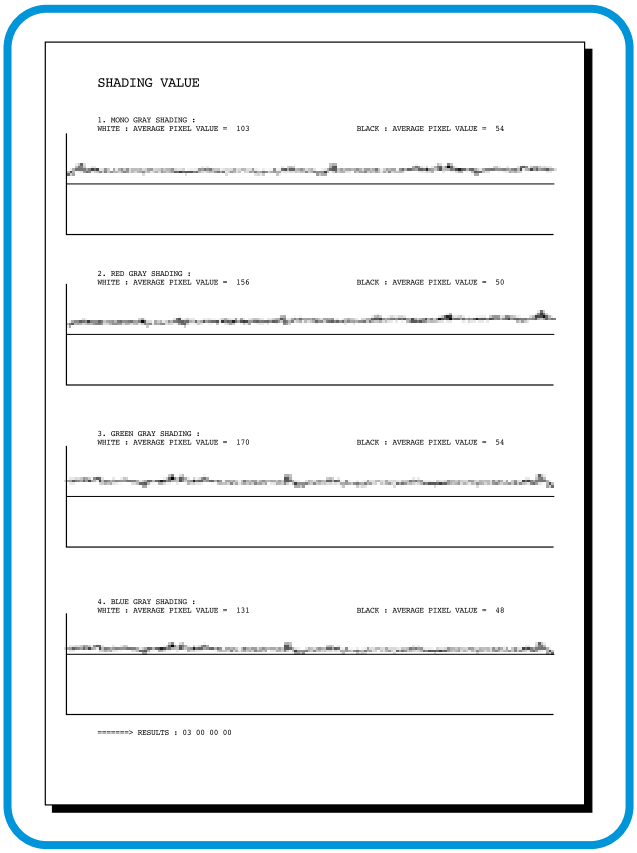
SHADING TEST

The function is to get the optimum scan quality by the specific character of the CCD(Charge Coupled Device). If the copy image quality is poor, perform this function to check the condition CCD unit.

< Method >

1. Select the [ADJUST SHADING] at the TECH MODE.
2. Push the SET UP button then an image will be scanned.
3. After the scan, CCD SHADING PROFILE will be print out.
4. If the printed image is different to the image, the CCD is defect.

NOTICE : *When you test CCD, make sure that the cover is closed.*


SHADING VALUE
1. MONO GRAY SHADING :
WHITE : AVERAGE PIXEL VALUE = 103
BLACK : AVERAGE PIXEL VALUE = 54
2. RED GRAY SHADING :
WHITE : AVERAGE PIXEL VALUE = 156
BLACK : AVERAGE PIXEL VALUE = 50
3. GREEN GRAY SHADING :
WHITE : AVERAGE PIXEL VALUE = 170
BLACK : AVERAGE PIXEL VALUE = 54
4. BLUE GRAY SHADING :
WHITE : AVERAGE PIXEL VALUE = 131
BLACK : AVERAGE PIXEL VALUE = 48
=======> RESULTS : 03 00 00 00

6.5.5 Report

PROTOCOL LIST

This list shows the sequence of the CCITT group 3 T.30 protocol during the most recent sending or receiving operation. Use this list to check for send and receive errors. If a communication error occurs while the machine is in TECH mode, the protocol list will print automatically.

SYSTEM DATA

This list provides a list of the user system data settings and tech mode settings.

6.6 Engine Test Mode

The Engine Tests Mode supplies useful functions to check the condition of the engine. It tests the condition of each device and displays the result of the test on the LCD. It is classified into 5 functions)0~4), and are shown below.

6.6.1 To enter the Engine Test Mode

To enter the Engine Test mode

Press Menu → # → 1 → 9 → 3 → 1 in sequence, and the LCD briefly displays **'Engine Test',** the machine has entered Engine Test Mode.

6.6.2 Diagnostic

NO.	Sub No.	Engine test	Remark
0	1	Motor Test	1 : On, 2 : Off
	2	PickUp Test	1 : On, 2 : Off
	3	Fan Test	1 : On, 2 : Off
	4	Manual Clt Test	1 : On, 2 : Off
	5	PTL Test	1 : On, 2 : Off
1	1	LSU Motor Test	1 : On, 2 : Off
	2	LSU Hsync Test	1 : On, 2 : Off
	3	LD Test	1 : On, 2 : Off
2	1	Feed Sen Test	Check : Check Start
			Next : Next Sensor Check
	2	Exit Sen Test	Check : Check Start
			Next : Next Sensor Check
	3	Cover Sen Test	Check : Check Start
			Next : Next Sensor Check
	4	Empty Sen Test	Check : Check Start
			Next : Next Sensor Check
	5	Manual Sen Text	Check : Check Start
			Next : Next Sensor Check
3	1	Therm ADC 180	1 : On, 2 : Off (maintain the fusing temp. 80C)
	2	Therm ADC 140	1 : On, 2 : Off (maintain the fusing temp. 135C)
	3	Therm ADC 120	1 : On, 2 : Off (maintain the fusing temp. 160C)
	4	Therm ADC 100	1 : On, 2 : Off (maintain the fusing temp. 191C)
4	1	MHV Test	1 : On, 2 : Off (-1550V ± 50V)
	2	Dev Bias Test	1 : On, 2 : Off (-430V ± 20V)
	3	THV EN/NEG Test	1 : On, 2 : Off (-1000V +300V/-150V)
	4	THV ON (1300V)	1 : On, 2 : Off (+1300V ± 20V)
	5	THV ADC 1300V	1 : On, 2 : Off (ADC Value : 101 ± 5)
	6	THV ADC 600V~3500V	1 : On, 2 : Off (Compare each ADC Value)

6.7 Identify Sale Date

This function confirms the date that consumer bought product and used the product for the first time.
When the consumer first operate the machine, it will start a scan and page count.
The time the machine was first used is remembered.

These settings are are remembered after memory delete (Clear All Memory).

< Method >

Press MENU, #, 1, 9, 3, # in sequence.Firmware version is displayed on LCD.
Press 1(in the number keypad) : The LCD display shows "Updated date"
Press 2(in the number keypad) : The LCD display shows "Product first use date"

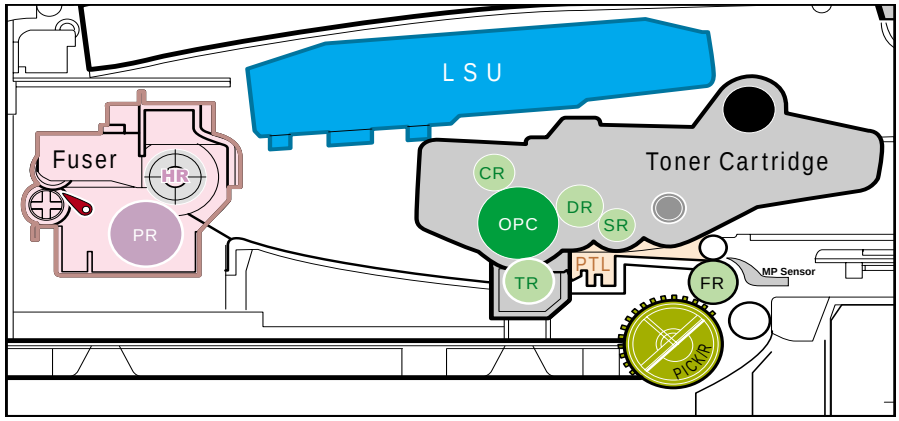
6.8 Consumables and Replacement Parts

The cycle period outlined below is a general guideline for maintenance.
The example list is for an average usage of 50 transmitted and received documents per day.
Environmental conditions and actual use will may vary.
The cycle period given below is for reference only.

COMPONENT	REPLACEMENT CYCLE
ADF Rubber	20,000 Pages
ADF Roller	60,000 Pages
Pick-up Roller	60,000 Pages
Friction Pad	60,000 Pages
Transfer Roller	60,000 Pages
Fuser	60,000 Pages
Toner Cartridge	3,000 Pages (A4 IDC 5% Pattern)

6.9 Abnormal Image Printing and Defective Roller

If abnormal image prints periodically, check the parts shown below.



1. **OPC Drum**
2. **Charge Roller**
3. **Supply Roller**
4. **Developing Roller**
5. **Transfer Roller**
6. **Heat Roller**
7. **Pressure Roller**

No	Roller	Abnormal image period	Kind of abnormal image
1	OPC Drum	75.5mm	White spot, Block spot
2	Charge Roller	37.7mm	Black spot
3	Supply Roller	37.0mm	Horizontal density band
4	Develop Roller	35.2mm	Horizontal density band
5	Transfer Roller	45.3mm	Black side contamination/transfer fault
6	Heat Roller	66.3mm	Black spot and fuser ghost
7	Pressure Roller	75.5mm	Black side contamination

6.10 Error Messages

The display on the front panel shows the messages to indicate the printer 's status or errors.Refer to the tables below to understand the message 's meaning and clear the problem if necessary.Messages and their meanings are listed in alphabetical order,with numbered messages following.

BYPASS JAM

Meaning : When the machine detected the non-feeding from BYPASS Tray.
Solution : Open the side Cover and clear the jam.

COMM. ERROR

Meaning : A problem with the facsimile communications has occurred.
Solution : Try again.

DOCUMENT JAM

Meaning : Loaded document has Jammed in the feeder When Document Jam aeeurred at AD
Solution : Clear the document Jam.

DOOR OPEN

Meaning : The side cover is not securely latched.
Solution : Clear the cover until it clicks in place.

DRUM WARNING

Meaning : When the machine has encountered the drum life,14000 print pages.
Solution : Use little more change if "REPLACE DRUM" is marked in LCD window.

GROUP NOT AVAILABLE

Meaning : You have tried to select a group location where only a single location number can be used, such as when adding locations for a multi-dial operation.
Solution : Try again, check location for group.

Heating Error

Meaning : During operation, Temperature does not go up.
Solution : Check thermister contact point & Heating Lamp.

LINE BUSY

Meaning : The remote FAX didn't answer
Solution : Try again.

LINE ERROR

Meaning : Your unit cannot connect with the remote machine, or has lost contact because of a problem on the phone line. When the machine has a problem in cause of fax data reception step
Solution : Try again. If failure persists, wait an hour or so for the line to clear then try again.

LOAD DOCUMENT

Meaning : You have attempted to set up a sending operation with no document loaded. Load a document and try again.
Solution : Try again. Make sure the remote machine is OK.

MEMORY FULL

Meaning : The memory has become full.
Solution : Either delete unnecessary documents, or retransmit after more memory becomes available, or split the transmission into more than one operation.

NO ANSWER

Meaning : The remote machine was not answered after all the redial attempts.
Solution : Try again. Make sure the remote machine is OK.

NO CARTRIDGE

Meaning : When the machine detected the toner cartridge has not been installed.
Solution : Install the Cartridge.

NO. NOT ASSIGNED

Meaning : The speed dial location you tried to use has no number assigned to it.
Solution : Dial the number manually with the keypad, or assign the number.

NO PAPER [ADD PAPER]

Meaning : The recording paper has run out. The printer system stops.
Solution : Load the recording paper in the paper feeder.

OPEN HEAT ERROR

Meaning : Thermister does not connected to main board or contact point is not coupled tightly in power on.
Solution : Check thermister contact point, Heating Camp & Thermostat.

OVERHEAT

Meaning : The printer part has overheated.
Solution : Your unit will automatically return to the standby mode when it cools down to normal operating temperature. If failure persists, call service.

PAPER JAM 0
OPEN/CLOSE DOOR

Meaning : Recording paper has jammed in paper feeding area. Recording paper is jammed in pick-up unit
Solution : Press STOP and clear the jam.

PAPER JAM 1/2
OPEN/CLOSE DOOR

Meaning : Recording paper has jammed inside the unit. Recording paper has jammed in paper exit unit.
Solution : Clear the jam.

RETRY REDIAL?

Meaning : The machine is waiting for the programmed interval to automatically redial.
Solution : You can press START to immediately redial, or STOP to cancel the redial operation.

TONER EMPTY

Meaning : When the machine has encountered the Toner Empty.
Solution : Replace the Toner Cartridge.

TONER LOW

Meaning : Toner may be low
Solution : Toner may be unevenly distributed. Remove the toner cartridge and shake it gently to evenly distribute the toner. Then replace the toner cartridge.

Scanner Locked

Meaning : Scanner is locked by locker.
Solution : Check locker. Connect the Flat-Cable.

7. Troubleshooting

7.1 Paper Feeding Problems

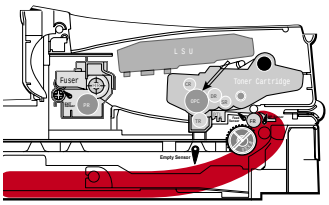
7.1.1 Wrong Print Position

• **Description** Printing begins at wrong position on the paper.

Check and Cause	Solution
Wrong sense time caused by defective feed sensor actuator.	Replace the defective actuator

7.1.2 JAM 0

• **Description**
1. Paper is not exited from the cassette.
2. Jam-0 occurs if the paper feeds into the printer.

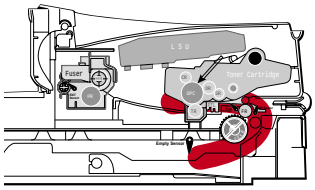


Check and Cause	Solution
1. Check the Solenoid by using DCU diagnostic mode 06.	1. Replace the solenoid.
2. Check if the pad is loose due to bad sealing of the side-pad.	2. Replace the side-pad Assembly L or R, if necessary.
3. Check the surface of the roller-pick-up for foreign matter.	3. Clean with soft cloth dampened with IPA(Isopropyl Alcohol) or water.
4. If continuous clusters occur, check whether the assembly slot between shaft-pickup and housing-pickup become open or is broken away.	4. Replace the Housing-Pickup and/or Shaft-Pickup.
5. If the paper feeds into the printer rand Jam 0 occurs, perform DCU to check feed-sensor of the engine board.	

7.1.3 JAM 1

• Description

1. Recording paper is jammed in front of or inside the fuser.
2. Recording paper is stuck in the discharge roller and in the fuser just after passing through the Actuator-Feed.

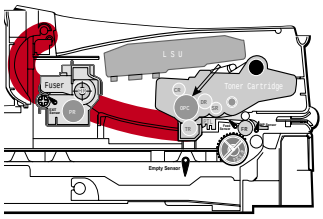


Check and Cause	Solution
1. If the recording paper is jammed in front of or inside the fuser. (Perform DCU diagnostic code of)	1. Replace the SMPS.
2. If the recording paper is stuck in the discharge roller and the fuser just after passing through the Actuator-Feed, Feed Actuator may be defective.	2. Reassemble the Actuator-Feed and Spring-Actuator if the returning is bad.

7.1.4 JAM 2

• Description

1. Recording paper is jammed in front of or inside the fuser.
2. Recording paper is stuck in the discharge roller and in the fuser just after passing through the Actuator-Feed.



Check and Cause	Solution
1. If the paper is completely fed out of the printer, but Jam 2 occurs : Exit sensor is defective. • After the paper is completely discharged, actuator Exit should return to the original position to shut the photo-sensor. Sometimes it takes longer hour than it should and does not return.	1. Check if the exit sensor actuator is defective. • Check if the actuator exit is unformed (Check if the lever part is unformed in shape). • Check whether burrs occur in the assembly part of the actuator exit or not and if the actuator is smoothly operated. • Check if foreign matters and wire get caught in the actuator exit's operation.
2. If the paper is rolled in the Fuser Roller: • This occurs when a Guide claw is broken away or transformed. • It occurs when the Spring of a Guide claw is broken away or transformed. • It occurs when the Heat-Roller or Pressure-Roller is seriously contaminated with the toner.	2. If the paper is stuck in the fuser : disassemble the fuser and remove the jammed paper, and clean the surface of the pressure roller with dry gauze.
3. Paper is accordion in the fuser.	3. Remove the jammed paper after disassembling the fuser : Clean the surface of the pressure roller with dry gauze. • Remove the toner particles stained on the rib. • Check the assemblage and performance of the exit.

7.1.5 Multi-Feeding

• **Description** Multiple sheets of paper are fed at once.

Check and Cause	Solution
1. Solenoid malfunction(the solenoid does not work properly): Perform DCU mode : solenoid check 06.	1. Replace the solenoid if necessary.
2. Pad-Friction is contaminated with foreign matter.(oil..)	2. Clean the pad friction with soft clothe dampened with IPA(Isopropyl Alcohol).
3. The face of paper is blended.	3. Use the smooth paper.

7.1.6 Paper rolled in the fuser

• **Description** If contaminated at intervals of 57mm on the back of a paper.

Check and Cause	Solution
1. Contamination of the pressure roller. (Background, Hot off set)	1. Disassemble the fuser, clean the area between the Heat-roller and Thermistor and remove the foreign matter of the pressure roller. 2. If background appears badly in the printing, fix it by referring to the solutions for background. (See 4.5.8 Background)

7.1.7 Paper rolled in the OPC

• **Description** Paper is rolled up in the OPC.

Check and Cause	Solution
1. Paper is too much thin.	1. Recommend to use normal paper.
2. The face of paper is curled.	2. How to remove the rolled paper in the OPC. • Remove the paper while turning the OPC against the ongoing direction. • Clean fingerprints on the OPC softly with soft cloth dampened with IPA(Isopropyl Alcohol) or tissue.

7.1.8 Defective ADF

• **Description** ADF (Automatic document Feeder) is not properly operated.

Check and Cause	Solution
1. Check if ADF rubber and HOLDER rubber are damaged.	1. Replace the contaminated or damaged part.
2. Check if the document sensors of OPE ASS'Y (2 paper sensors) are normal.	2. If you cannot confirm the damaged part with the naked eye, try to replace the OPE ASS'Y.

7.2. Printing Problems (malfunction)

7.2.1 Defective Operation (LCD WINDOW ■■■) Display

• **Description** Strange characters are displayed on the OPE Panel and buttons are not operated.

Check and Cause	Solution
1. Clear the memory. 2. Check if OPE HARNESS is connected to the Main Board correctly.	1. Try again after clearing the memory. 2. After confirming that OPE HARNESS is connected to the Main Board correctly, if it is so, then replace the OPE ASS'Y and Main Board in sequence.

7.2.2 Defective LCD Operation

• **Description** **Defective LCD Operation**

Check and Cause	Solution
1. Clear the memory. (See page). 2. Confirm to catch a click sound, while a key on the OPE panel is pressed on.	1. The key is wrong itself or wrongly assembled. 2. Even after the key has been replaced, it is still wrong, try to replace the OPE ASS'Y and the Main B'D in sequence.

7.2.3 Not function of the gear of the fuser due to melting away

• **Description** The motor breaks away from its place due to gear melting away.

Check and Cause	Solution
DCU Mode : Check if the Error States '60' '62' '68' occur. Check the operation of Fuser Erasing Lamp On/Off with the Error Code Check -10-.	1. Replace the Fuser. 2. Replace the Main Control board.

7.2.4 Paper Empty

• **Description** The paper lamp on the operator panel is on even when paper is loaded in the cassette.

Check and Cause	Solution
1. Bending or deformation of the actuator of the paper sensor.	1. Replace the defective actuator.
2. The function of the engine board is defective Perform DCU mode: Perform DCU diagnostic code 8.	2. Replace the engine board.

7.2.5 Paper Empty without indication

• **Description** The paper lamp on the operator panel does not come on when the paper cassette is empty.

Check and Cause	Solution
1. Bending or deformation of the actuator of the paper sensor.	1. Replace the defective actuator.
2. The function of the engine board is defective Perform. DCU mode : Perform DCU diagnostic code 8.	2. Replace the engine board.

7.2.6 Cover Open

• **Description** The ERROR lamp is on even when the print cover is closed.

Check and Cause	Solution
1. The hook lever in the top cover may be defective.	1. Replace the hook lever, if defective.
2. Check the connector (CN1 : Engine B'd↔HVPS) and circuit of the cover switch department in the Main Control board. Perform DCU mode : If Error state '64' occurs, Check the related codes of the Cover Open Error.	2. Check the insertion of the Cover Open S/W Connect. 3. Replace the Main Control board or Cover Open S/W.

7.2.7 No lamp on when the cover is open

• **Description** The ERROR lamp does not come on even when the printer cover is open

Check and Cause	Solution
1. Check the connector(CN8) and circuit of the cover switch department in the Main Control board. Perform DCU mode : If Error state '64' occurs, Check the related codes of the Cover Open Error	1. Check the insertion of the Cover Open S/W Connect. 2. Replace the Main Control board or Cover Open S/W.

7.2.8 Defective motor operation

• **Description** Main motor is not driving when printing, and paper does not feed into the printer, resulting 'Jam 0'.

Check and Cause	Solution
1. Motor harness or sub PCB may be defective.	1. Check the motor harness, replace it, if defective.
2. Perform DCU diagnostic code 00 and Check the motor operation.	2. Replace the SMPS, if necessary.

7.2.9 No Power

• **Description** When system power is turned on, all lamps on the operator panel do not come on.

Check and Cause	Solution
1. Check if the power input and SMPS output are normal.	1. Replace the power supply cord or SMPS.
2. Check the inferiority of LED-Panel on the front-cover if the LED of Panel does not appear after normal warming-up.	2. Replace the control board. 3. Replace the LED-panel.

7.2.10 Vertical Line Getting Curved

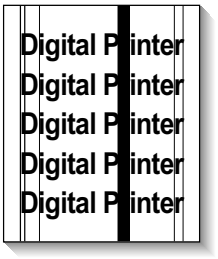
• **Description** When printing, vertical line gets curved.

Check and Cause	Solution
1. If the supply of +24v is unstable in the Main Control board linking with LSU, check drive by DCU Mode: LSU Check -05- LSU Motor on.	1. Replace LSU. 2. Replace the Main Control board.

7.3 Printing Quality Problems

7.3.1 Vertical Black Line and Band

• **Description**
1. Straight thin black vertical line occurs in the printing.
2. Dark black vertical band occur in the printing.



Check and Cause	Solution
1. Damaged develop roller in the Developer. Deformed Doctor-blade or cleaning-blade.	1. If causes 1 and 2 occur in the developer cartridge, replace the developer and try to print out.
2. Scratched surface of the discharge roller in the developer.	2. Replace the transfer roller if occurred as No. 3.
3. Partly depression or deformation on the surface of the transfer roller.	

7.3.2 Vertical White Line

• **Description** White vertical voids in the image.

Check and Cause	Solution
1. Foreign matter stuck onto the window of internal lenses of LSU mirror.	1. Foreign matter stuck onto the window : Clean the LSU window with recommended cleaner(IPA) Clean the window with a clean cotton swab.
2. Foreign matter or toner particles between the developer roller and blade. (In case the life of the developer has been expired, white lines or light image occur in front of the image.)	2. Foreign matter in the LSU : Open the cover of LSU and clean with a cotton swab on the surface of the reflex mirror.
3. It may occur when Burr and foreign substances are on the window of the developer frame.	3. No 3. : Remove the foreign matter and burr of the exposure window. (Developer cartridge)
4. If the fuser is defective, voids occur periodically at the top of a black image.	4. No. 4. : Open the front cover and check ribs that corresponds to the position of the voids. Remove if found.
	5. If the problems are not solved, replace the developer cartridge.

7.3.3 Horizontal Black Band

• Description

1. Dark or blurry horizontal stripes occur in the printing periodically. (They may not occur periodically.)

Check and Cause	Solution
1. Bad contacts of the voltage terminals to developer.	1. Clean each voltage terminal of the Charge, Supply, Develop and Transfer roller. (remove the toner particles and paper particles)
2. The rollers of developer may be stained. Charge roller = 38.5mm Supply roller = 51mm Develop roller = 50mm Transfer roller = 56.8mm	2. Clean the right Gear that has relatively small gap of the teeth in the OPC.
	3. If the malfunction persists, replace the developer.

7.3.4 Black/White Spot

• Description

1. Dark or blurry black spots occur periodically in the printing.
2. White spots occur periodically in the printing.

Check and Cause	Solution
1. If dark or blurry black spots occur periodically, the rollers in the Developer may be contaminated with foreign matte or paper particles. (Charge roller : 38.5 mm interval OPC drum : 96 mm interval)	1. Run OPC cleaning Mode Print and run the Self-test 2 or 3 times.
2. If faded areas or voids occur in a black image at intervals of 96 mm, or black spots occur elsewhere, the OPC drum surface is damaged.	2. In case of 96 mm interval unremovable in 1, cleanly remove foreign substances stuck on the OPC location equivalent to black spots and white spots with a dry duster.
3. If a black image is partially broken, the transfer voltage is abnormal or the transfer roller's life has expired.	3. The transfer roller guarantees 125,000 sheets printing. If the roller's life is expired, replace it.
	4. In case of 38.5 mm interval unremovable in 1, take measures as to replace the developer cartridge and try to print out.
	5. Clean the inside of the set against the paper particles and foreign matter in order not to cause the trouble.

7.3.5 Light Image

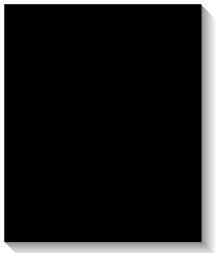
• **Description** The printed image is light, with no ghost.

Digital Printer
Digital Printer
Digital Printer
Digital Printer
Digital Printer

Check and Cause	Solution
1. Develop roller is stained when the toner of developer cartridge is almost consumed.	1. Check if the Toner Save mode is off.
2. Ambient temperature is below than 10°C.	2. No 1 : Replace the developer cartridge and try to print out.
3. Bad contact caused by the toner stains between the high voltage terminal in the HVPS and the one in the set.	3. No 2 : Wait 30 minutes after printer is powered on before you start printing.
4. Abnormal output from the HVPS. (Run self-test and check 1~4)	4. No3 : Clean up the contaminated area by the toner.
	5. Replace the HVPS if the problems are not solved by the above four directions.

7.3.6 Dark Image or a Black

• **Description** The printed image is dark.



Check and Cause	Solution
1. No charge voltage in the engine board. (Perform DCU diagnostic code 01)	1. Clean the high voltage charge terminal.
2. Charge voltage is not turned on due to the bad contacts between power supply in the side of the Developer and charge terminal of HVPS.	2. Check the state of the connector which connects the engine board and HVPS.
	3. Replace the HVPS if not solved by the above direction 1 and 2.

7.3.7 Uneven Density

• **Description** Print density is uneven between left and right.

Digital Printer
Digital Printer
Digital Printer
Digital Printer
Digital Printer

Check and Cause	Solution
1. The pressure force on the left and right springs of the transfer roller is not even, the springs are damaged, the transfer roller is improperly installed, or the transfer roller bushing or holder is damaged.	1. Replace both the left and right Spring Holder.
2. The life of the Developer has expired.	2. Occur in the developer cartridge, replace the developer and try to print out.
3. The toner level is not even on the developer roller due to the bad blade.	

7.3.8 Background

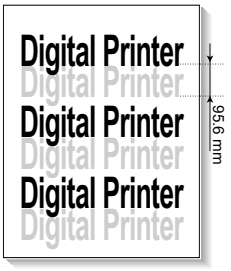
• **Description** Light dark background appears in whole area of the printing.

Digital Printer
Digital Printer
Digital Printer
Digital Printer
Digital Printer

Check and Cause	Solution
1. Recycled recording paper has been used.	1. B/S is not guaranteed when using recycled paper.
2. The life of the Developer has expired.	2. Replace the Developer that has expired.
3. The up-to-down movement of the transfer roller is swift?	3. Clean the busing part of the transfer roller.
4. The HVPS is normal? (Perform DCU diagnostic code 01~04)	4. Replace the Developer if not solved by the above direction 1~3.

7.3.9 Ghost (1)

• **Description** Ghost occurs at 96 mm intervals of the OPC drum in the whole printing.



Check and Cause	Solution
1. Bad contacts caused by contamination from toner particles between high voltage terminal in the main body and the electrode of the Developer.	1. Clean the terminals when contaminated by toner particles.
2. Bad contacts caused by contamination from toner particles between high voltage terminal in the main body and the one in the HVPS board.	2. Occur in the developer cartridge, replace the developer and try to print out.
3. The life of developer is expired.	3. Replace the engine board if not solved by the above directions 1-2.
4. Transfer roller lifetime(125,000 sheets) has expired.	4. If not solved by the direction 3, check the transfer roller lifetime and replace it.
5. Abnormal low temperature(below 10°C).	5. Wait about 1 hour after power on before using printer.
6. Damaged cleaning blade in the developer.	6. Occur in the developer cartridge, replace the developer and try to print out.

7.3.10 Ghost (2)

• **Description** Ghost occurs at 96 mm intervals of the OPC drum in the whole printing.
(When printing on card stock or transparencies using manual feeder)

Check and Cause	Solution
When printing on card stock thicker than normal paper or transparencies such as OHP, higher transfer voltage is required.	Select 'Thick Mode' on paper type menu from the software application and after using returning to the original mode is recommended.

7.3.11 Ghost (3)

• **Description** White ghost occurs in the black image printing at 51mm intervals.

Check and Cause	Solution
1. The life of the developer may be expired.	1. Occur in the developer cartridge, replace the developer and try to print out.
2. The abnormal voltage and bad contact of the terminal of the supply roller	2. Check the approved voltage of the supply roller and contact of the terminal and adjust if necessary.

7.3.12 Ghost (4)

• **Description** Ghost occurs at 70 mm intervals.

Check and Cause	Solution
The temperature of the fuser is maintained high.	1. Disassemble the fuser and remove the contaminated toner particles on the roller and clean the foreign matter between Thermistor and Heat roller. (⚠ Caution: can be deformed)

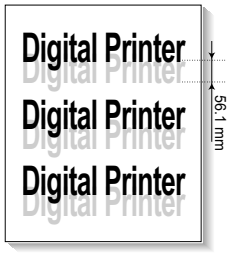
7.3.13 Satins on the Face of Page

• **Description** The background on the face of the printed page is stained.

Check and Cause	Solution
1. Toner leakage due to improperly sealed developer.	1. Replace the developer cartridge.
2. If the transfer roller is contaminated, satins on the face of page will occur.	2. If the transfer roller is contaminated, run PC Cleaning Mode Print 2 or 3 times. And perform Self-Test 2 or 3 times to remove contamination.

7.3.14 Satins on Back of Page

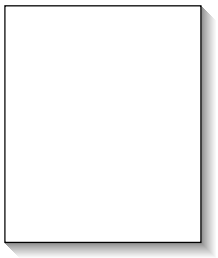
• **Description** The back of the page is stained at 56.1 mm intervals.



Check and Cause	Solution
1. Transfer roller is contaminated.	1. Perform the OPC Cleaning Mode Print 2 or 3 times. Run Self-Test to remove the contamination of the transfer roller.
2. Pressure roller is contaminated.	2. Replace the transfer roller if contaminated severely.
	3. Disassemble the fuser and clean the H/R(Heat Roller) and P/R(Pressure roller). And check the area between H/R and Thermistor. If contaminated, clean the area not to be deformed.

7.3.15 Blank Page Print out (1)

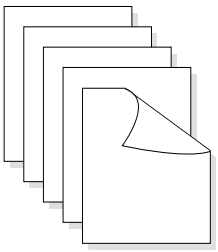
• **Description** Blank page is printed.



Check and Cause	Solution
Bad ground contacts in OPC and/or developer.	Remove contamination of the terminals of the developer and the unit.

7.3.16 Blank Page Print out (2)

• **Description**
1. Blank page is printed.
2. One or several blank pages are printed.
3. When the printer turns on, several blank pages print.



Check and Cause	Solution
1. Bad ground contacts in OPC and/or developer.	1. Remove contamination of the terminals of the developer.
2. Abnormal solenoid.	2. Perform the engine self test using DCU to check if the Solenoid is normal.(refer to code 06)
	3. If not solved by the above directions 1-2, Replace the engine board.
	4. Turn the power off, delete the data of PC and try printing again.

7.4 Fax & PhoneProblems

7.4.1 No Dial Tone

• **Description** While on-hook button is pressed, there is no dial tone.

Check and Cause	Solution
1. Check if the telephone line cord is connected to TEL LINE correctly. 2. Check if it makes CLICK sound while OHD key is pressed. 3. Check the connection of HARNESS between the LIU and the Main B'D. 4. Check if the SPEAKER is connected correctly.	1. If the telephone cord is normal but there is no dial tone, then try to replace the LIU B'D. 2. If you cannot hear the OHD CLICK sound, the OPE ASS'Y may be defective. Try to replace the OPE ASS'Y. 3. Check the connection of Speaker, and try to replace it. 4. Lastly, try to replace the Main B'D.

7.4.2 Defective MF DIAL

• **Description** The MF DIAL is not functioning.

Check and Cause	Solution
1. Check if the telephone line is connected correctly. 2. Wile the BUTTON KEY is pressed, check to catch a CLICK sound. 3. Check the connection of HARNESS between the LIU and the Main PBA.	1. If you cannot catch the OHD CLICK sound, the OPE ASS'Y may be defective. Try to replace the OPE ASS'Y. 2. If you can catch a CLICK sound, after checking the connection of HARNESS between the LIU and the Main PBA, try to replace the HARNESS. 3. The problem still persists, then replace the LIU and the main B'D in sequence. **Notes:** Product supports the MF DIAL type only.

7.4.3 Defective FAX FORWARD/RECEIVE

• **Description** The FAX FORWARD/RECEIVE is not functioning.

Check and Cause	Solution
1. Check if you can catch a dial tone by pressing OHD. 2. Check if you can catch a RECEIVE tone while MODEM testing in the TECH mode.	1. If the MODEM testing is normal and there is no dial tone, then try to replace the LIU B'D. 2. If the MODEM testing is abnormal, try to replace the Main B'D.

7.4.4 Defective FAX FORWARD

• **Description** RECEIVE is functioning, but FORWARD is not functioning or the received data are broken.

Check and Cause	Solution
1. Check if there is NOISE when pressing on-hook dial. 2. Check the RECEIVE condition by trying to forward a FAX to another fax machine from the forwarding side FAX. 3. Check if the telephone line connected to the Product is contaminated or gets stripped off or down.	1. If it makes NOISE while on-hooking, replace or repair the telephone line.

7.4.5 Defective FAX RECEIVE (1)

• **Description** FORWARD is functioning, but RECEIVE is not functioning or the received data are broken.

Check and Cause	Solution
1.Check if there is NOISE when pressing on-hook dial. 2.Check the RECEIVE condition by trying to receive a FAX at another fax machine.	1.If it makes NOISE while on-hooking, replace or repair the telephone line.

7.4.6 Defective FAX RECEIVE (2)

• **Description** The received data are lengthened or cut in the printing.

Check and Cause	Solution
1. Check if there is NOISE when pressing on-hook dial. 2. Ask to the forwarding side, check the image quality of another machine receiving a FAX additionally sent to.	1. If it makes NOISE, rearrange the telephone line. (Refer to 'Defective FAX RECEIVE'.) 2. Check if the FAX status of the forwarding side is also normal.

7.4.7 Defective FAX RECEIVE (3)

• **Description** The phone is ringing continuously, but it cannot receive.

Check and Cause	Solution
Check if the RECEIVE mode is TEL MODE or FAX MODE.	Even when the RECEIVE mode is changed to FAX MODE, it cannot receive, then replace the LIU and the Main B'D in sequence.

7.4.8 Defective FAX RECEIVE (4)

• **Description** The received data is reduced by more than 50% in the printing.

Check and Cause	Solution
Check the FAX status of the forwarding side.	After checking the data of the forwarding side, correct the FAX of the forwarding side.

7.4.9 Defective Automatic Receiving

• **Description** The automatic receiving function is not working.

Check and Cause	Solution
1. Check if the RECEIVE mode is TEL MODE or FAX MODE.	1. If the RECEIVE mode is set to the TEL MODE, reset it to the FAX MODE. 2. Even after the RECEIVE mode is changed to the FAX mode, it cannot receive, then try to replace the LIU and the Main B'D in sequence.

7.5 Copy Problems

7.5.1 White Copy

• **Description** Blank page is printed out when receiving.

Check and Cause	Solution
1. Check if the recording papers are inserted reversely. 2. Perform the Adjust Scanner in the TECH MODE. (See page ??	1. Insert the paper with the copy side to be faced down. 2. In case the output waveform is abnormal in the Adjust Scanner, replace the CCD Module, while replace the Main B'D in normal.

7.5.2 Block Copy

• **Description** Black page is printed out when receiving.

Check and Cause	Solution

7.5.3 Vertical Black Line

• **Description** Vertical black lines occur in the printing.

Check and Cause	Solution
1. Check if there are substance materials on CCD Modual. 2. Perform a Adjust Scanner to check if the waveform is normal. (See page ??) 3. Clean the cartridge nozzle.	1. If there are some stains on the surface of CIS, wipe them off with alcohol (IPA). 2. If the CIS waveform is abnormal, replace the CIS ASS'Y. 3. Clean the nozzle and confirm again. 4. After confirming the CIS waveform and cleaning the nozzle, if the vertical black lines still occur, then try to replace the Main B'D.

7.5.4 Defective image quality

• **Description** The copied image is light or bad.

Check and Cause	Solution

7.6 Scanning Problems

7.6.1 Defective PC Scan

• **Description** The PC Scan is not functioning at all.

Check and Cause	Solution
1. Check the Cable (USB or Parallel)	1. If the PC and the cable are not connected properly, reconnect it.
2. Check if the driver is installed properly.	2. After confirming that it is proper by performing a PC printing test related to driver setup, if it is not so, reinstall it. (Refer to User's Manual.)
3. Check if copy function operation normally.	3. If copy function works, replace the Main PBA. If copy function doesn't work, replace the CCD Ass'y and try again.

7.6.2 Defective Image Quality of PC Scan

• **Description** The image PC scanned is not clear or bad.

Check and Cause	Solution
1. Check the waveform form by performing a CCD test in TECH mode. (Refer to ???)	1. If the CCD waveform form is abnormal, try to replace the CCD ASS'Y.
2. Check if the resolution is set too low in PC Scan options. (Refer to User's Manual.)	2. If the resolution is set to low, let the user be acquainted with the using method well.

7.7 Toner Cartridge Service

It is not guaranteed for the default caused by using other toner cartridge other than the cartridge supplied by the Samsung Electronic or caused by non-licensed refill production.

7.7.1 Precautions on Safe-keeping of Toner Cartridge

Excessive exposure to direct light more than a few minutes may cause damage to the cartridge.

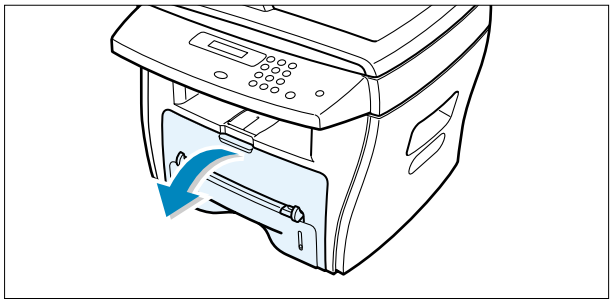
7.7.2 Service for the Life of Toner Cartridge

If the printed image is light due to the life of the toner, you can temporarily improve the print quality by redistributing the toner(Shake the toner cartridge), however, you should replace the toner cartridge to solve the problem thoroughly.

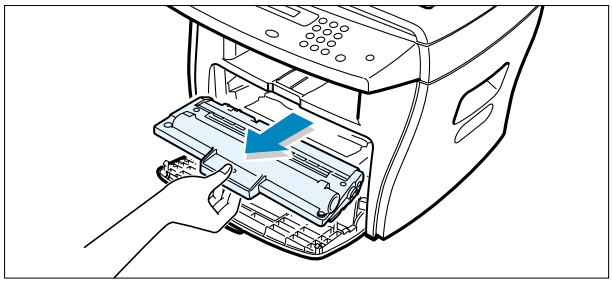
7.7.2.1 Redistributing Toner

When the toner cartridge is near the end of its life, white streaks or light print occurs. The LCD displays the warning message, “Toner Low.” You can temporarily reestablish the print quality by redistributing the remaining toner in the cartridge.

1. Open the Front Cover.

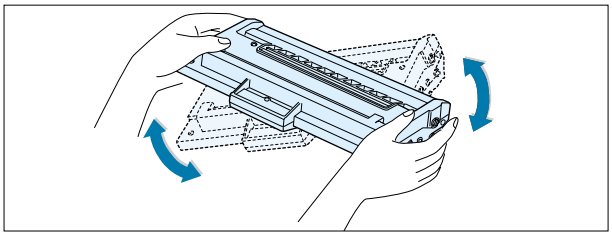


2. Lightly pushing the used cartridge down, pull it out.

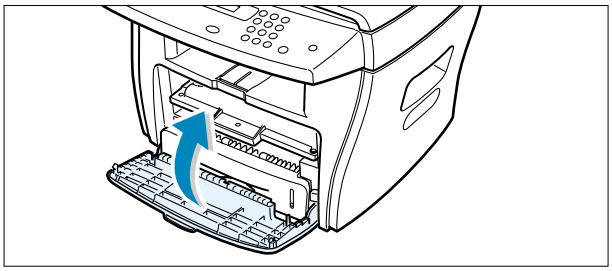


Note : Help the environment by recycling your used toner cartridge. Refer to the recycling brochure packed with the toner cartridge for details.

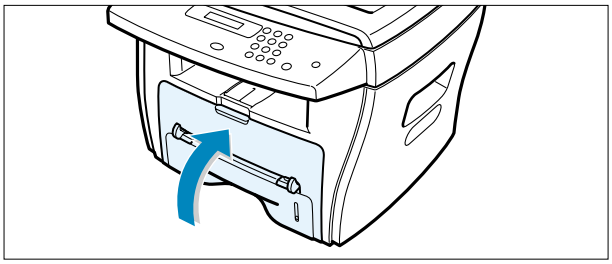
3. Unpack the new toner cartridge and gently shake it horizontally four or five times to distribute the toner evenly inside the cartridge.



4. Save the box and the cover for shipping. Slide the new toner cartridge in until it locks into place.



5. Close the front cover.



7.7.3 Service for Judgement of Inferior Expendables and the Standard of Guarantee

Please refer to User's Manual or Instructions on Fax/Printer Expendables SVC for the judgement of inferior expendables and the standard of guarantee besides this service manual.

7.7.4 Signs and Measures at Poor toner cartridge

Fault	Signs	Cause & Check	Solution
Light image and partially blank image (The life is ended.)	• The printed image is light or unclean and untidy. • Some part of the image is not printed. • Periodically a noise as "tick tick" occurs.	1. If the image is light or unclean and untidy printed image - Shake the developer and then recheck. (1)NG: Check the weight of the developer (2)OK: Lack of toner, so the life is nearly closed. 2. Some part of image is not printed - Shake the developer and then recheck. (1)NG: Check the weight of the developer and clean the LSU window with a cotton swab, then recheck. (2)OK: Lack of toner, so the life is nearly closed. 3. Periodically a noise as "tick tick" occurs - Measure the cycle and the weight of the developer. 4. White vertical stripes on the whole screen or partly : Check the weight of the developer.	1. All of 1, 2, 3 above- (1)The weight of the developer ended: 800g ± 20g (2)If it become better by shaking, replace with a new developer after 50-100 sheets in the closing state of the life span. 2. In case of 2- If it becomes better after cleaning the LSU window, then the developer is normal. (Because of foreign substance on the LSU window, the image has not been printed partly.) 3. In case of 3- If the cycle of noise is about 2 seconds, the toner inside the developer has been nearly exhausted.(Purchase and replace with a new developer after using about 200 sheets at the point of occurrence) 4. In case of 3- This is a phenomenon caused by lack of toner, so replace with a new developer.
Toner Contamination	• Toner is fallen on the papers periodically. • Contaminated with toner on prints partly or over the whole surface.	1. Toner is fallen on the paper periodically. (1)Check the cycle of the falling of the toner. (2)Check the appearance of both ends of the developer OPC drum. 2.The center of the printed matter is contaminated with toner. (1)Check whether foreign substances or toner are stuck to the terminal (contact point) of the developer. (2)Check whether the state of the terminal assembly is normal.	1. If both ends of the OPC drum are contaminated with toner: Check the life of the developer. (In case of less than 820g, the life may be expired.) 2. Check whether it could be recycled. 3. If it cannot be recycled: Replace the developer.

Fault	Signs	Cause & Check	Solution
White Black spot	• Light or dark black dots on the image occur periodically. • White spots occur in the image periodically.	1. If light or dark periodical black dots occur, this is because the developer rollers are contaminated with foreign substance or paper particles. (1)35mm interval : Charged roller (2)75mm interval : OPC cycle 2. If white spots occur in a black image at intervals of 75mm, or black spots occur elsewhere, the OPC drum is damaged or foreign substance is stuck to the surface. 3. If a black and white or graphic image is partially broken at irregular intervals, the transfer roller's life has been expired or the transfer voltage is abnormal.	1. In case of 1 above - Run OPC Cleaning Mode Print 4-5 times repeatedly to remove. Especially check foreign substance on the OPC surface, then remove them with a clean gauze moistened with IPA(Isopropyl Alcohol) not to damage OPC if necessary. **Never use usual alcohol.** 2. In case of 2 If they are not disappeared by running OPC Cleaning Mode Print 4-5 times. : at intervals of 37mm - Replace the developer. : at intervals of 75mm - Remove foreign substance. : Broken image - Replace the developer according to carelessness. 3. In case of 3 - Exchange the transfer roller because the life of the transfer roller in use has been expired. (Check the transfer voltage and readjust if different.)
Recycled product	• Poor appearance of the developer. • Unclean and rough printouts. • Bad background in the image.	1. Poor appearance of the developer. (1)Check the damage to label and whether different materials are used. (2)Check the appearance of parts of the developer, such as frame, hopper. 2. Unclean and rough printouts. (1)Check whether foreign substance or toner are stuck to the terminal (contact point) of the developer. (2)Check whether the state of the terminal assembly is normal.	1. In case of 1 - (1)If there is an evidence of disassembling the developer. (2)If materials other than normal parts of the developer are added or substituted. 2. In case of 2 - If there are any abnormals in connection with the situation of 1. (1)It occurs when the developer is recycled over 2 times. (2)If toner nearly being expired are collected to use, it is judged as the recycled developer.

Fault	Signs	Cause & Check	Solution
Ghost & Image Contamination	• The printed image is too light or dark, or partially contaminated black. • Totally contaminatedblack. (Black image printed out) • The density of printouts is too dark and ghost occurs.	1. The printed image is too light or dark, or partially contaminated black. (1)Check whether foreign substance or toner are stuck to the terminal(point of contact) of the developer. (2)Check whether the terminal assembly is normal.	1. All of 1, 2, 3 above (1)Remove toner and foreign substances adhered to the contact point of the developer. (2)The contact point of the unit facing that of the developer also must be cleaned. (3)If the terminal assembly is unsafe: • Fully stick the terminal to or reassemble it after disassembling. • Disassemble the side plate and push the terminal to be stuck, then reassemble it.
		2. Totally contaminated black. (Black image printed out) (1)Check whether foreign substances are stuck to the terminal(point of contact) of the developer and the state of assembly. (Especially check the charged roller terminal.)	2. In case of 2 It is a phenomenon when the OPC drum of the developer is not electrically charged. Clean the terminals of the charged roller, then recheck it.
		3. The printed image is dark and ghost occurs. (1)Check foreign substance attached to the terminal (point of contact) of the developer and the state of assembly. (Especially check the developing roller terminal.)	3. In case of 3 It is a phenomenon as the developing bias voltage of the developer. Clean the terminals of the developing roller, then recheck it.

8. Exploded Views and Parts List

8.1 Main Assembly Exploded view ..... page(5-2)
8.2 Rx Drive Ass'y Exploded view ..... page(5-5)
8.3 ADF Assembly Exploded view ..... page(5-6)
8.4 OPE Assembly Exploded view(SCX-4216F) ..... page(5-10)
8.5 OPE Assembly Exploded view(SCX-4116/4016) ..... page(5-12)
8.6 Scanner Assembly Exploded view ..... page(5-14)
8.7 Middle Cover Assembly Exploded view ..... page(5-16)
8.8 Frame Ass'y Exploded view ..... page(5-17)
8.9 Fuser Ass'y Exploded view ..... page(5-20)
8.10 Cassette Ass'y Exploded view ..... page(5-22)

- Deal drawings and service parts are declared for the items with higher rate of inferiority and replaceable in the level of service description only.
- If inferiority occurs, you can replace the parts by the unit declared in deal drawings and service items.

Way to observe Part Code & Description

Part code and Description is quoted and controlled by determined standard. Refer to this determined standard, it will help with ordering Part.

• **There are two kinds of Part code inscription type.**

(● : figure, ■ : character (alphabet))

Type 1 : Controlled by Company : It can be commonly used for all kinds of product SEC produce. Mostly, electronics Parts.

Type 2 : Controlled by Division : It is used or one produce. Mostly, Mostly, mechanical Parts.

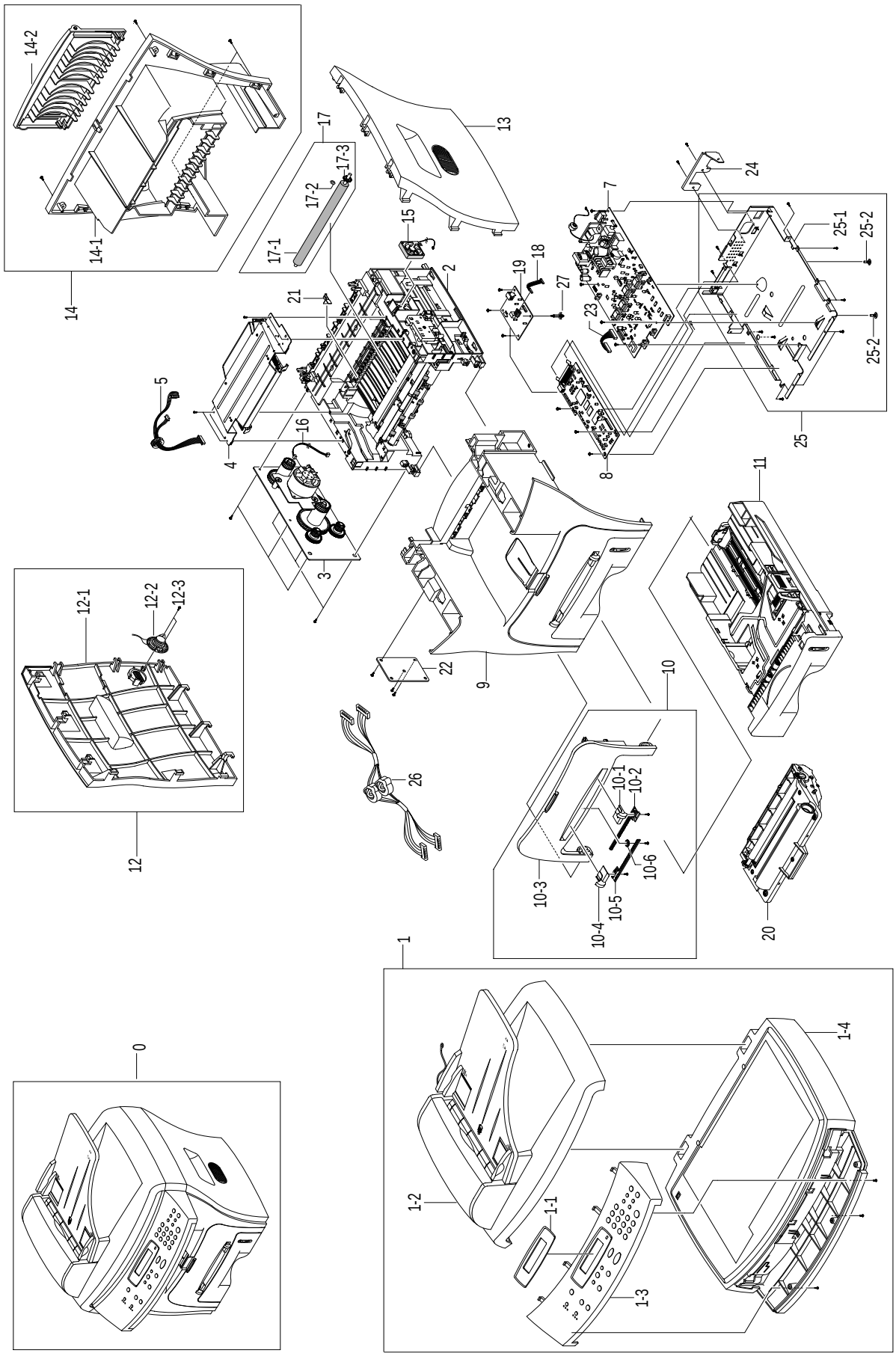
• **A/S privately used part :** It is only used for A/S .

• **Ass'y part :** Assembled by more than 2 Parts. If necessary part is not A/S Part, Ass'y part including necessary par can be used. It is shown in the diagram and drawing of SVC manual.

• Ass'y part and A/S privately used Part is distinguished by part Code and Description.
The are inscription type 2. It is recognized by Part character and front side of description.

DIVISION	PART CODE	DESCRIPTION
A/S Private	**81-****** (JB81-00039A)	AS-***** (AS-USE)
ASS'Y Part	**75-****** (JB75-00068A)	MEC-***** (MEC-CHUTE)
ASS'Y Part	**92-****** (JB92-01131A)	PBA ****** (PBA MAIN-CONTROLLER)
ASS'Y Part	**97-****** (JB97-01089A)	MEA ****** (MEA UNIT-PULLEY IDLE)

8.1 Main Assembly



Main Assembly Parts List

SA : Service Available
O : Service available **X** : Service not available

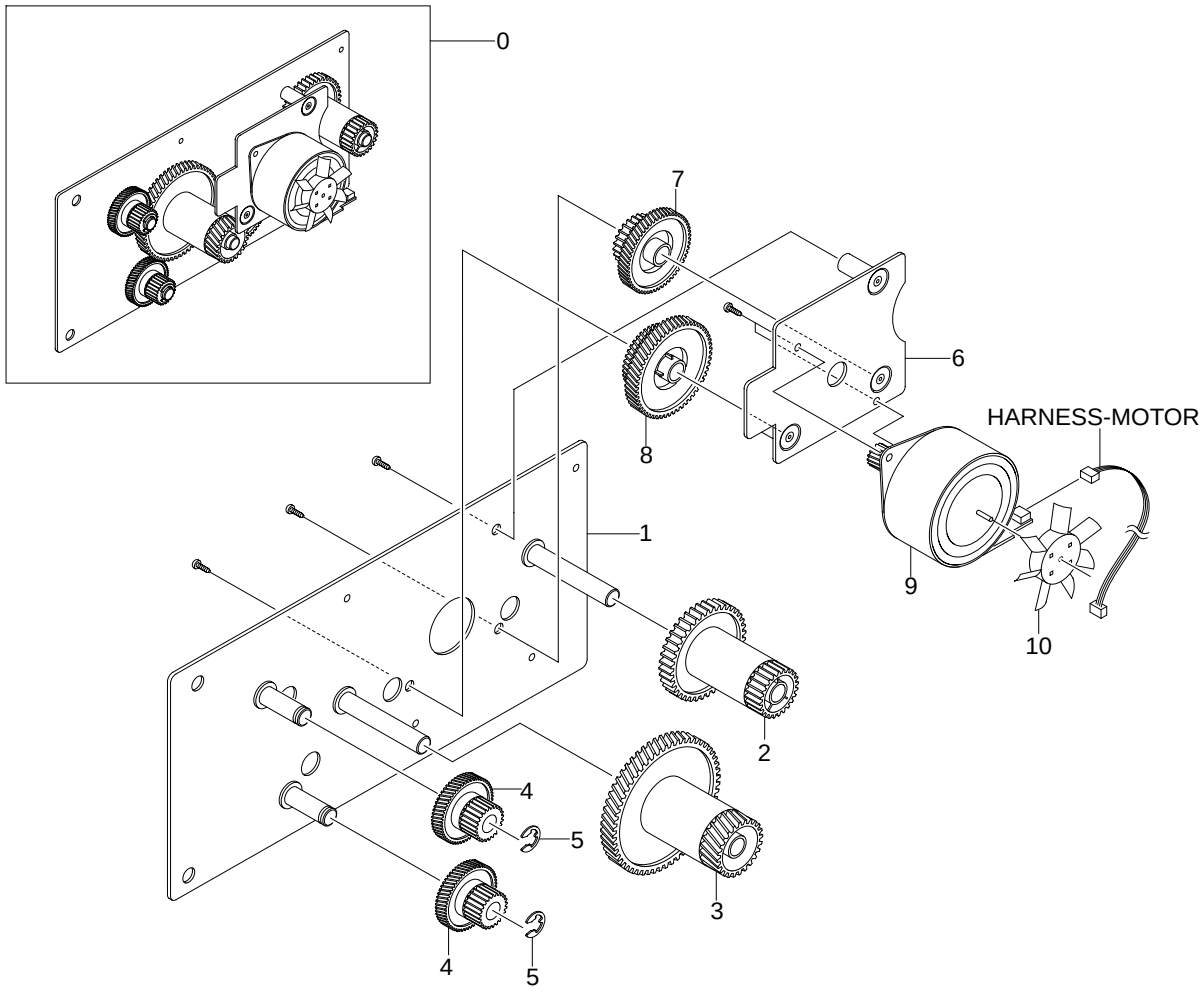
No.	Description	SEC.Code	Q'ty	SA	Remark
0	SCX-4216F / SCX-4116 / SCX-4016				
1	ELA HOU-UNIT SCAN	JC96-02669A	1		SCX-4216F
	ELA HOU-UNIT SCAN(4116)	JC96-02790A	1		SCX-4116
	ELA HOU-UNIT SCAN	JC96-02788A	1		SCX-4016
1-1	COVER-LCD WINDOW	JC63-00251A	1		
1-2	ELA HOU-ADF	JC96-02654A	1		
1-4	ELA HOU-OPE	JC96-02658A	1		SCX-4216F
	ELA HOU-OPE(3IN1)	JC96-02785A	1		SCX-4116
	ELA HOU-OPE(3IN1)	JC96-02784A	1		SCX-4016
1-3	ELA HOU-PLATEN	JC96-02657A	1		
2	ELA HOU-UNIT FRAME_220V	JC96-02710A	1		220V
3	ELA UNIT-RX DRIVE	JC96-02733A	1		
4	UNIT-HUMMINGBIRD LSU	JC59-00018A	1		
5	CBF HARNESS-LSU	JC39-00242A	1		
7	SMPS-SMPS(V2)+HVPS	JC44-00043A	1		220V
8	PBA MAIN-MAIN	JC92-01431A	1		SCX-4216F
	PBA MAIN-COPIER	JC92-01463A	1		SCX-4116 / 4016
9	MEA UNIT-COVER MIDDLE	JC97-01723A	1		
10	MEA UNIT-COVER FRONT(SEC)	JC97-01746F	1		
10-1	ADJUST-M-MANUAL_R	JC70-00303A	1		
10-2	ADJUST RACK-M-MANUAL	JC70-00304A	2		
10-3	COVER-M_FRONT(ROCKY)	JC63-00103E	1		
10-4	ADJUST-M-MANUAL_L	JC70-00302A	1		
10-5	GEAR-RACK_PINION	JC66-00387A	1		
11	MEA UNIT-CASSETTE, USA	JC97-01750A	1		
12	ELA HOU-COVER SIDE L	JC96-02709A	1		SCX-4216F
12-1	COVER-M-SIDE L	JC63-00137A	1		
12-2	SPEAKER	3001-001293	1		
12-3	SCREW-TAPTITE	6003-000264	2		
12	COVER-M-SIDE L	JC63-00137A	1		SCX-4116 / 4016
13	COVER-M-SIDE R	JC63-00138A	1		
14	MEA UNIT-COVER REAR	JC97-01724A	1		
14-1	COVER-M-REAR	JC63-00140A	1		
14-2	COVER-M-FACE UP	JC63-00142A	1		
15	FAN-DC_HUMMINGBIRD	JC31-00027A	1		
16	CBF HARNESS-MOTOR	JC39-00241A	1		
17	MEA ETC-TR	JC97-01793A	1	O	
17-1	ROLLER-TRANSFER ROLLER	JC66-00528A	1		
17-2	GEAR-TRANSFER	JC66-00395A	1		

Main Assembly Parts List(cont.)

SA : Service Available
O : Service available **X** : Service not available

No.	Description	SEC.Code	Q'ty	SA	Remark
17-3	PPR-SPACER_TR	JC72-00851A	1		
18	CBF SIGNAL-LIU	JC39-00270A	1		SCX-4216F Only
19	PBA SUB-LIU_USA_EXT	JC92-01481C	1		SCX-4216F Only
20	ELA-TONER UNIT	*	1	X	
21	PLATE-P-CHANNEL	JC61-00606A	1		
22	PBA SUB-CONN	JC92-01506A	1		
23	CBF HARNESS-ENGINE	JC39-00240B	1		
24	BRACKET-P-INLET, ROCKY	JC61-00693A	1		
25	MEA UNIT-SHIELD ENGINE	JC97-01794A	1		
25-1	SHIELD-ENGINE, ROCKY	JC63-00144A	1		
25-2	SUPPORTER	6103-001056	2		
26	CBF HARNESS-SCAN	JC39-00268A	1		
27	SUPPORTER	6103-001048	1		

8.2 RX Drive Assembly

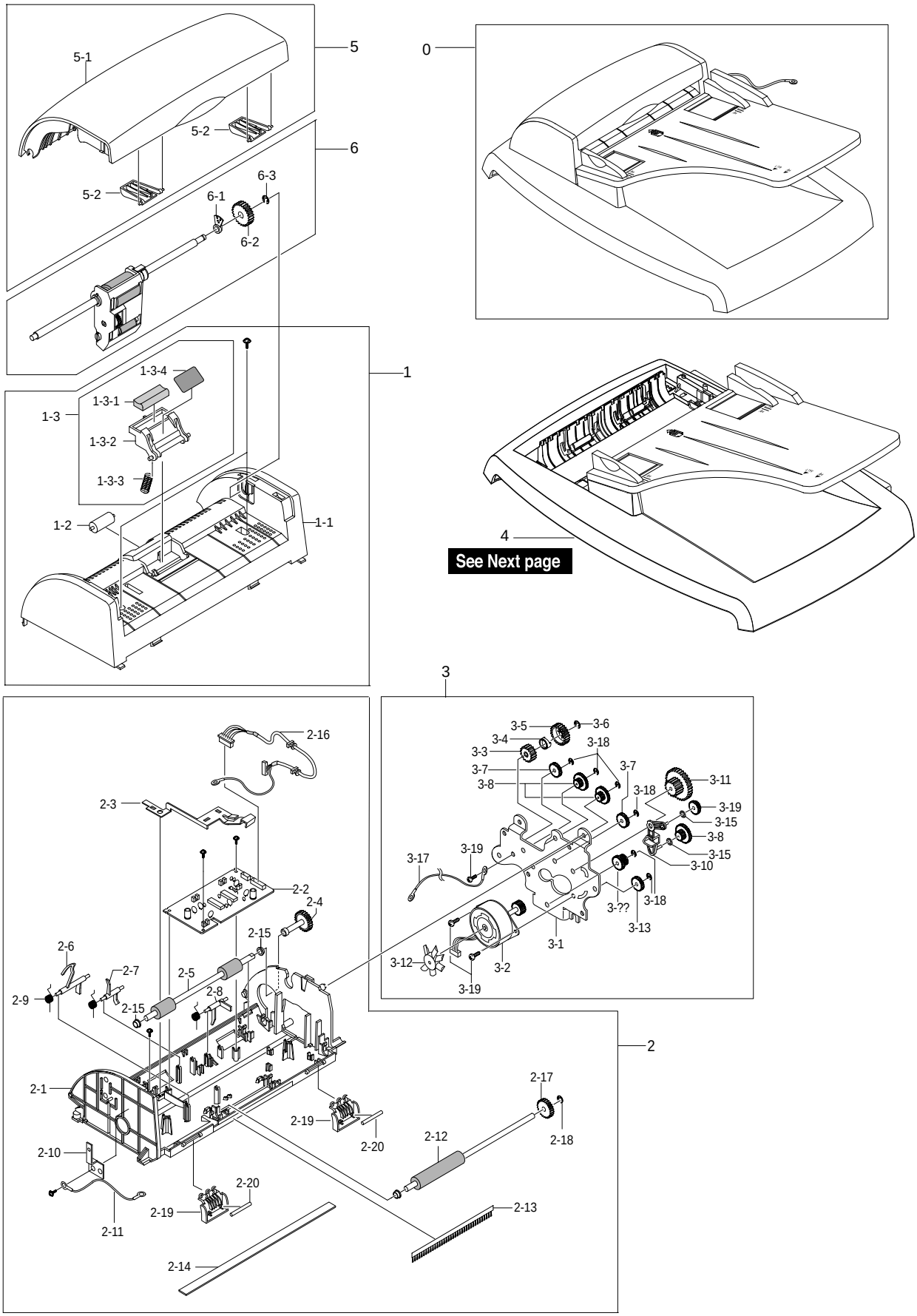


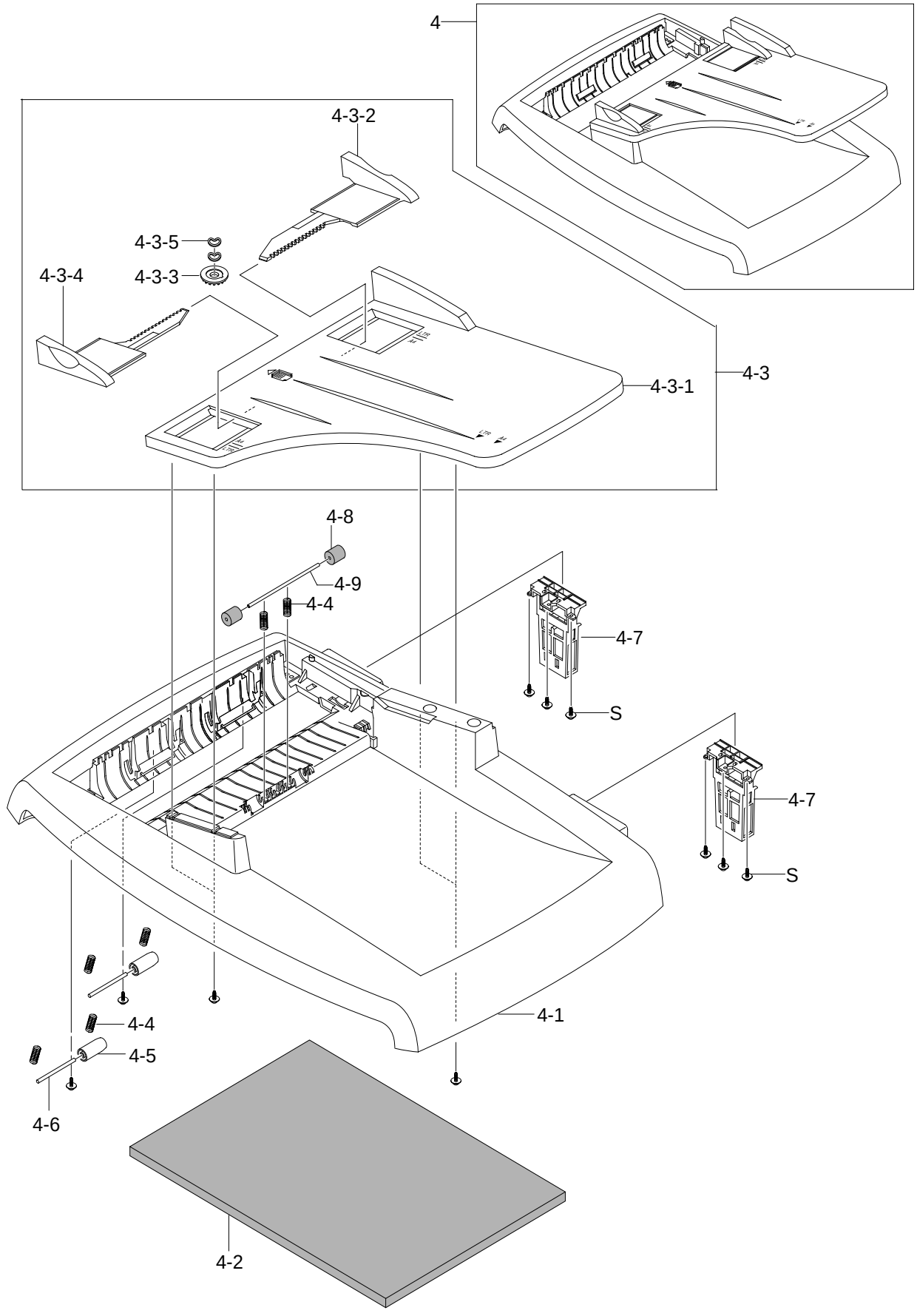
RX Drive Assembly Parts List

SA : Service Available
O : Service available **X** : Service not available

No.	Description	SEC.Code	Q'ty	SA	Remark
0	ELA UNIT-RX DRIVE	JC96-02733A	1	O	
1	BRACKET-P-GEAR 1400	JC61-00598A	1	X	
2	GEAR-RDCN 53/26	JC66-00388A	1	X	
3	GEAR-RDCN 113/33	JC66-00391A	1	X	
4	GEAR-RDCN 57/18	JC66-00389A	2	X	
5	RING-E	6044-000231	2	X	
6	BRACKET-P-MOTOR 1400	JC61-00599A	1	X	
7	GEAR-RDCN 103/41	JC66-00390A	1	O	
8	GEAR-RDCN 90/31	JC66-00392A	1	O	
9	MOTOR STEP-HUMMINGBIRD	JC31-00028A	1	O	
10	PMO-IMPELLER_DRV	JC72-00825A	1	X	

8.3 ADF Assembly

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ADF Assembly Parts List

SA : Service Available
O : Service available **X** : Service not available

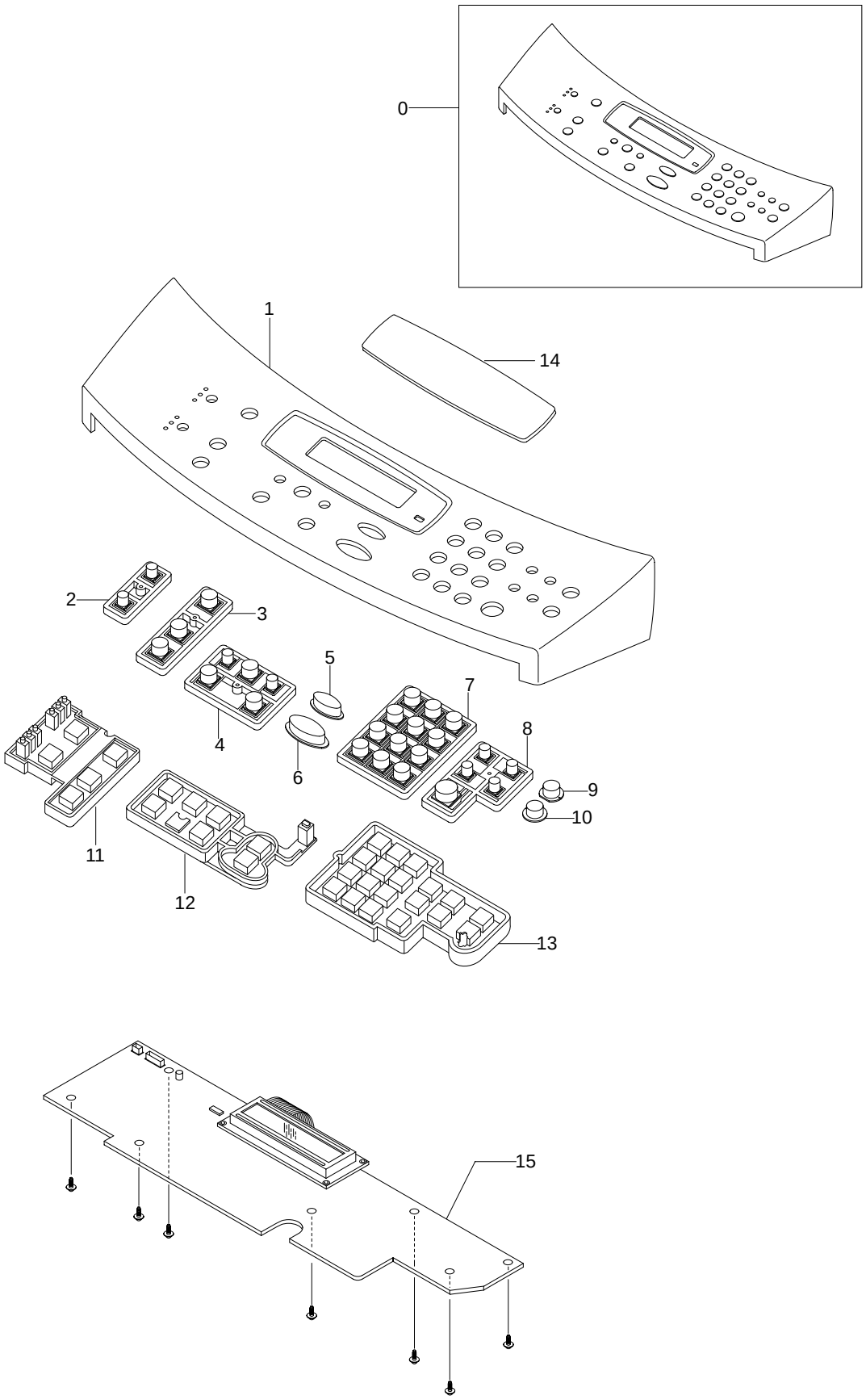
No.	Description	SEC.Code	Q'ty	SA	Remark
0	ELA HOU-ADF	JC96-02654A	1		
1	MEA UNIT-ADF UPPER	JC97-01710A	1		
1-1	COVER-M-ADF UPPER	JC63-00145A	1		
1-2	ROLLER-M-ADF IDLE	JC66-00461A	1		
1-3	MEA UNIT-HOLDER ADF	JC97-01709A	1		
1-3-1	RMO-ADF RUBBER	JB73-00052A	1		
1-3-2	HOLDER-M-ADF	JC61-00694A	1		
1-3-3	SPRING ETC-PAD	JC61-00387A	1		
1-3-4	SHEET-ADF HOLDER	JC63-00243A	1		
2	ELA HOU-ADF LOWER	JC96-02826A	1		
2-1	COVER-M-ADF LOWER	JC63-00148A	1		
2-2	PBA SUB-ADF	JC92-01507A	1		
2-3	GROUND-P-ADF	JC63-00149A	1		
2-4	SHAFT-M-FEED GEAR 38	JC66-00460A	1		
2-5	ROLLER-DRIVE	JC66-00560A	1		
2-6	PMO-ACTUATOR DOC SENSOR	JC72-01009A	1		
2-7	PMO-ACTUATOR REGI SENSOR	JC72-01010A	1		
2-8	PMO-ACTUATOR SCAN SENSOR	JC72-01011A	1		
2-9	SPRING ETC-TORSION DOC (CC2-F)	JB61-00076A	3		
2-10	IPR-GROUND_ROLLER	JC70-10467A	1		
2-11	CBF HARNESS-DRIVER GND	JB39-00065A	1		
2-12	ROLLER-EXIT	JC66-00559A	1		
2-13	MEC-BRUSH ANTISTATIC	JC75-00161A	1		
2-14	SHEET-WHITE BAR	JC63-00154A	1		
2-15	PMO-BUSH	JB72-00819A	4		
2-16	CBF HARNESS-ADR	JC39-00278A	1		
2-17	GEAR-AGITATOR-2	JC66-00310A	1		
2-18	RING-C	6044-000159	1		
2-19	GUIDE-STACKER SUB	JC61-00712A	2		
2-20	SHAFT-IDLE FEED	JC66-00558A	2		
2-S	SCREW-TAPTITE	6003-000196	9		
3	ELA HOU-ADF MOTOR	JC96-02652A	1		
3-1	BRACKET-GEAR	JC61-00776A	1		
3-2	MOTOR BLOWER-ADF	JC31-00023A	1		
3-3	GEAR-CLUTCH 29	JB66-00101A	1		
3-4	PMO-WHITE CLUTCH SUB 29	JB72-00844A	1		
3-5	GEAR-CLUTCH 39	JC66-00322A	1		
3-6	RING-C	6044-000159	1		
3-7	GEAR-IDLE 35 ADF	JC66-00458A	3		

ADF Assembly Parts List(cont.)

SA : Service Available
O : Service available **X** : Service not available

No.	Description	SEC.Code	Q'ty	SA	Remark
3-8	GEAR-40/21 ADF	JC66-00456A	3		
3-9	GEAR-SWING 31/20 ADF	JC66-00457A	1		
3-10	LINK-M-SWING ADF	JC66-00454A	1		
3-11	GEAR-58/25 ADF	JC66-00455A	1		
3-12	IMPELLER-ADF	JC66-00556A	1		
3-13	GEAR-REMOVE ADF	JC66-00557A	1		
3-14	WASHER-PLAIN	6031-000023	2		
3-15	IPR-WASHER WAVE	JB70-00070A	1		
3-16	WASHER-PLAIN	6031-000019	1		
3-17	CBF HARNESS-LIU GND	JB39-00103A	1		
3-18	RING-E	6044-000125	6		
3-19	SCREW-TAPTITE	6003-000269	3		
4	MEA UNIT-COVER PLATEN	JC97-01708A	1		
4-1	COVER-M-PLATEN(4IN1)	JC63-00146A	1		
4-2	SHEET-WHITE SPONGE	JC63-00209A	1		
4-3	MEA-TX STACKER(SEC)	JB97-01544B	1		
4-3-1	PMO-TX STACKER(SEC)	JB72-01166B	1		
4-3-2	PMO-DOC GUIDE(L)	JB72-01171B	1		
4-3-3	GEAR-PINION	JG66-40003A	1		
4-3-4	PMO-DOC GUIDE(R)	JB72-01170B	1		
4-3-5	IPR-WASHER SPRING CU	JF70-10616A	2		
4-4	SPRING ETC-FEED	JC61-00011A	6		
4-5	PMO-ROLL PINCH	JG72-40663A	2		
4-6	SHAFT-STACKER	JC66-00594A	2		
4-7	MEA UNIT-HINGE	JC97-01707A	2		
4-8	RPR-ROLLER EXIT IDLE	JC73-00091A	2		
4-9	ICT-SHAFT PINCH	JF70-40521B	1		
4-S	SCREW-TAPTITE	6003-000196	14		
5	MEA UNIT-COVER OPEN	JC97-01706A	1		
5-1	COVER-M-OPEN	JC63-00147A	1		
5-2	PMO-GUIDE PAPER	JB72-00843A	2		
6	MEA UNIT-PICKUP	JC97-01705A	1		
6-1	PMO-BUSHING WHITE	JF72-41306A	1		
6-2	GEAR-ADF 38	JB66-00103A	1		
6-3	RING-C	6044-000159	1		

8.4 OPE Unit Assembly(SCX-4216F)

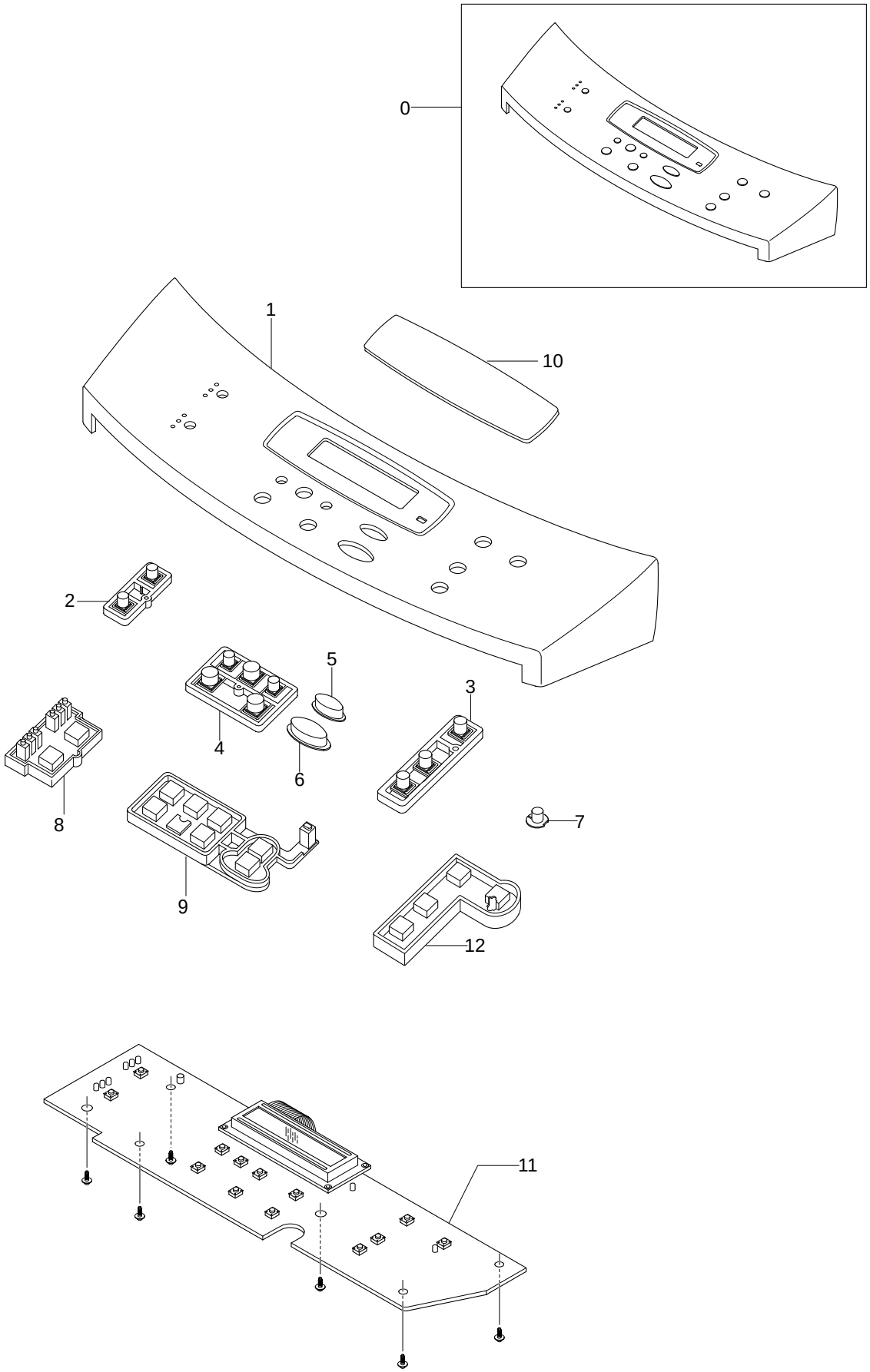


OPE Unit Assembly Parts List(SCX-4216F)

SA : Service Available
O : Service available **X** : Service not available

No.	Description	SEC.Code	Q'ty	SA	Remark
0	ELA HOU-OPE	JC96-02658A	1		
1	COVER-M-OPE(4IN1)	JC63-00153A	1		
2	KEY-M-RESOLUTION	JC64-00059A	1		
3	KEY-M-COPY	JC64-00054A	1		
4	KEY-M-SCROLL	JC64-00056A	1		
5	KEY-M-STOP	JC64-00055A	1		
6	KEY-M-START	JC64-00057A	1		
7	KEY-M-TEL	JC64-00053A	1		
8	KEY-M-FAX	JC64-00060A	1		
9	KEY-M-TONER SAVE	JC64-00058A	1		
10	KEY-M-TOLL SAVE	JC64-00061A	1		
11	RUBBER-COPY	JC73-00139A	1		
12	RUBBER-SCROLL	JC73-00137A	1		
13	RUBBER-TEL/FAX	JC73-00138A	1		
14	SHEET-LCD	JC63-00155A	1		
15	PBA SUB-OPE	JC92-01503A	1		
S	SCREW-TAPTITE	6003-000196	7		

8.5 OPE Unit Assembly(SCX-4016)

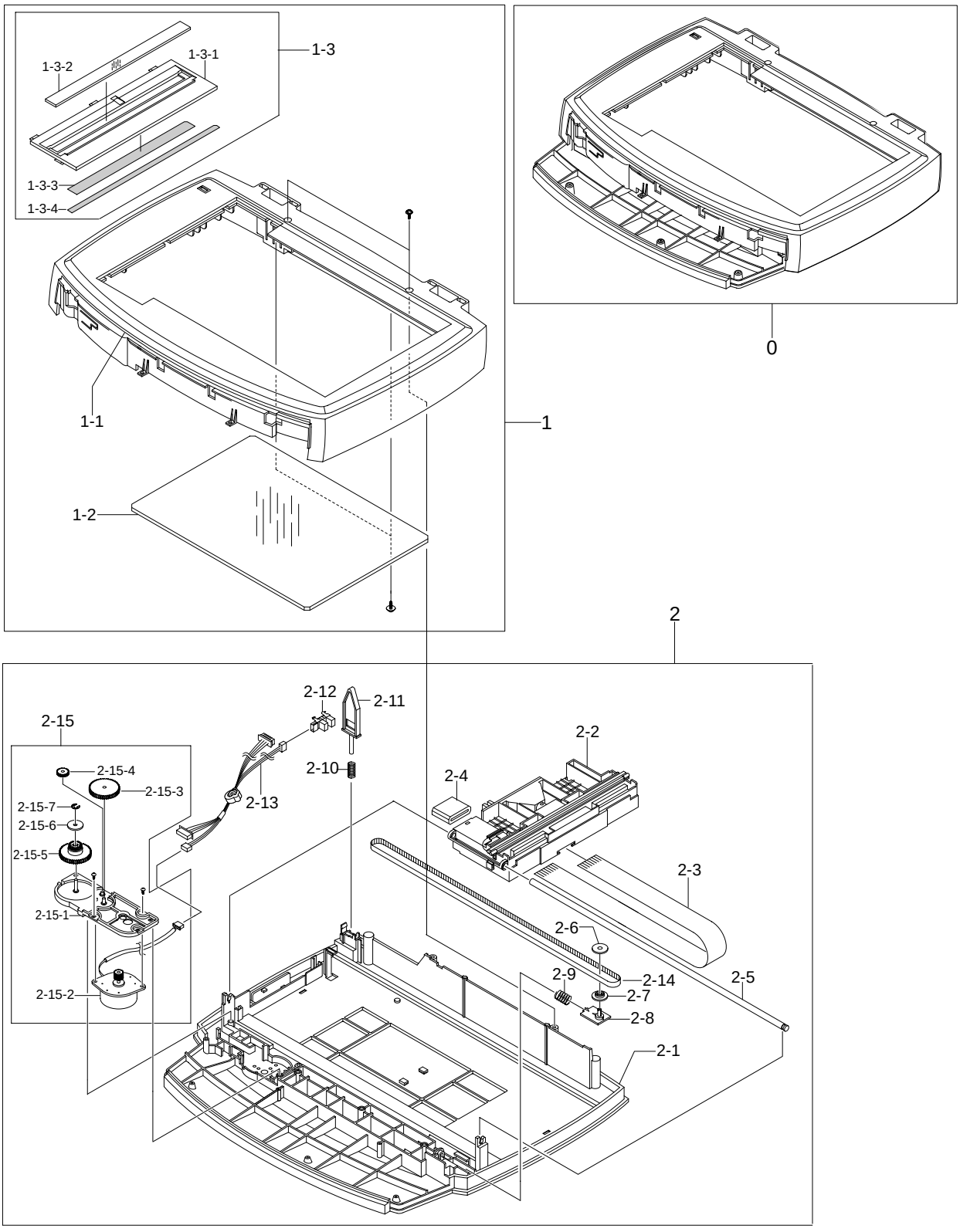


OPE Unit Assembly Parts List(SCX-4116/4016)

SA : Service Available
O : Service available **X** : Service not available

No.	Description	SEC.Code	Q'ty	SA	Remark
0	ELA HOU-OPE(3IN1)	JC96-02785A	1		SCX-4116
	ELA HOU-OPE(3IN1)	JC96-02784A	1		SCX-4016
1	COVER-M-OPE(3IN1)	JC63-00135D	1		
2	KEY-M-RESOLUTION(3IN1)	JC64-00051A	1		
3	KEY-M-COPY(3IN1)	JC64-00050A	1		
4	KEY-M-SCROLL	JC64-00056A	1		
5	KEY-M-STOP	JC64-00055A	1		
6	KEY-M-START(3IN1)	JC64-00057B	1		
7	KEY-M-TONER SAVE(3IN1)	JC64-00052A	1		
8	RUBBER-COPY(3IN1)	JC73-00136A	1		
9	RUBBER-SCROLL	JC73-00137A	1		
10	SHEET-LCD(4116)	JC63-00155D	1		SCX-4116
	SHEET-LCD(3IN1)	JC63-00155B	1		SCX-4016
11	PBA SUB-OPE	JC92-01504A	1		
12	RUBBER-IMAGE(3IN1)	JC73-00135A	1		
S	SCREW-TAPTITE	6003-000196	6		

8.6 Scanner Assembly

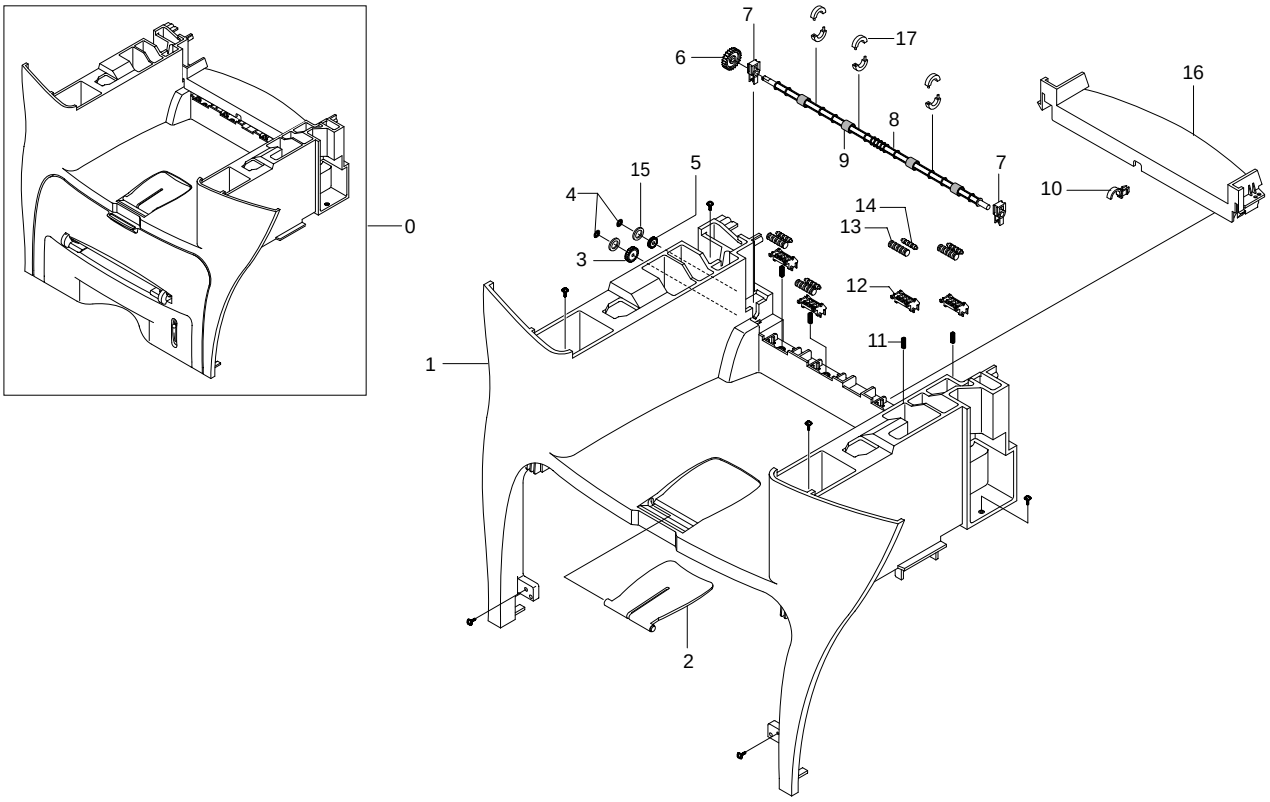


Scanner Assembly Parts List

SA : Service Available
O : Service available **X** : Service not available

No.	Description	SEC.Code	Q'ty	SA	Remark
0	ELA HOU-PLATEN	JC96-02657A	1		
1	MEA UNIT-SCAN UPPER	JC97-01712A	1		
1-1	COVER-M-SCAN UPPER	JC63-00151A	1		
1-2	GLASS-SCAN	JC01-00001A	1		
1-3	MEA UNIT-SCAN DUMMY	JC97-01711A	1		
1-3-1	COVER-M-SCAN DUMMY(4IN1)	JC63-00152A	1		
1-3-2	MCT-GLASS ADF	JC74-00019A	1		
1-3-4	LABEL(P)-SHADING	JB68-00644A	1		
2	ELA HOU-SCAN LOWER	JC96-02656A	1		
2-1	COVER-M-SCAN LOWER	JC63-00150A	1		
2-2	ELA HOU-CCD MODULE	JC96-02821A	1		
2-3	CBF SIGNAL-CCD FFC	JC39-00269A	1		
2-4	ELA UNIT-CORE	JB96-01381A	2		
2-5	ICT-SHAFT CCD	JB70-00145A	1		
2-6	PMO-HOLDER BELT	JB72-00764A	1		
2-7	PMO-PULLEY	JB72-00763A	1		
2-8	PMO-HOLDER BELT	JB72-01136A	1		
2-9	SPRING ETC-BELT	JB61-00109A	1		
2-10	SPRING-CS	6107-001135	1		
2-11	PMO-LEVER SENSOR	JC72-00755A	1		
2-12	PHOTO-INTERRUPTER	0604-001095	1		
2-13	CBF HARNESS-OPE/FLAT_COVER	JC39-00267A	1		
2-14	BELT-TIMING GEAR	6602-001067	1		
2-15	ELA HOU-SCAN MOTOR	JC96-02655A	1		
2-15-1	BRACKET-M-SCAN MOTOR	JC61-00698A	1		
2-15-2	MOTOR STEP-SCAN	JB31-00011A	1		
2-15-3	GEAR-REDUCTION	JB66-00084A	1		
2-15-4	GEAR-IDLE	JB66-00083A	1		
2-15-5	GEAR-TIMING	JB66-00082A	1		
2-15-6	PMO-HOLDER BELT	JB72-00764A	1		
2-15-7	RING-E	6044-000125	1		

8.7 Middle Cover Assembly

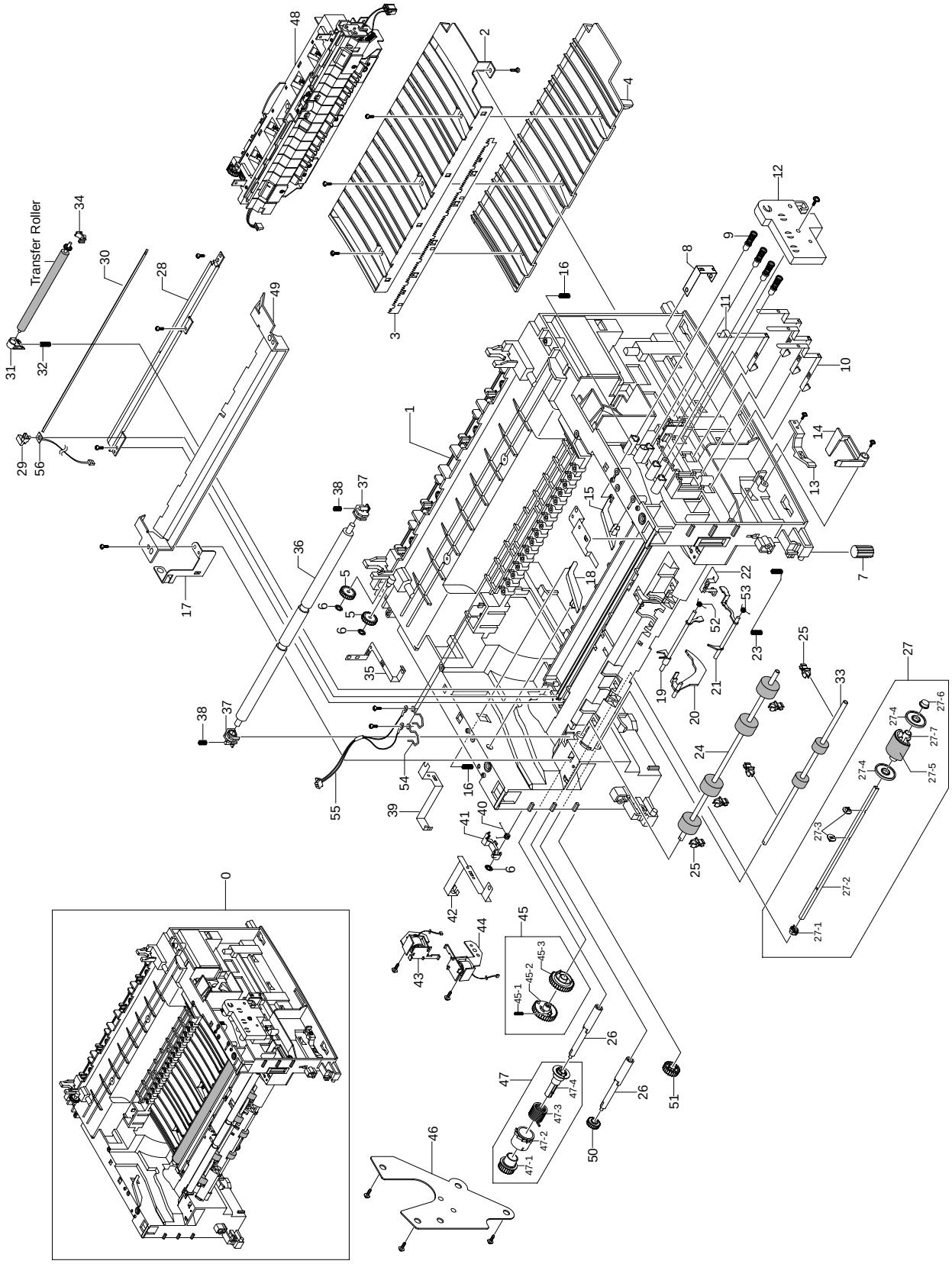


Middle Cover Assembly Parts List

SA : Service Available
O : Service available **X** : Service not available

No.	Description	SEC.Code	Q'ty	SA	Remark
0	MEA UNIT-COVER MIDDLE	JC97-01723A	1	O	
1	COVER-M-MIDDLE	JC63-00141A	1	X	
2	PMO-STACKER_RX(SEC)	JC72-00973C	1	X	
3	RING-CS	6044-000001	2	X	
4	GEAR-IDLE 23	JC66-00396A	1	X	
5	PMO-GEAR_EXIT_DRV16	JC72-00143A	1	X	
6	GEAR-EXIT F/DOWN	JC66-00038A	1	X	
7	MEC-BEARING,EXIT	JC75-10529A	2	X	
8	ROLLER-EXIT F/DOWN	JC66-00378A	1	X	
9	RMO-RUBBER EXIT	JC73-40915A	4	X	
10	PMO-BUSHING_F/DOWN	JC72-00387A	1	X	
11	SPRING-CS	6107-001163	4	X	
12	HOLDER-M-EXIT F/DOWN	JC61-00582A	4	X	
13	PMO-ROLLER_EXIT,MAIN	JC72-41081A	4	X	
14	PMO-ROLLER_EXIT,FR	JC72-41082A	4	X	
15	WASHER-PLAIN	6031-001051	2	X	
16	COVER-M-REAR UPPER	JC63-00143A	1	X	
17	ROLLER-M_DECURL	JC66-00626A	6	X	

8.8 Frame Assembly



Frame Assembly Parts List

SA : Service Available
O : Service available **X** : Service not available

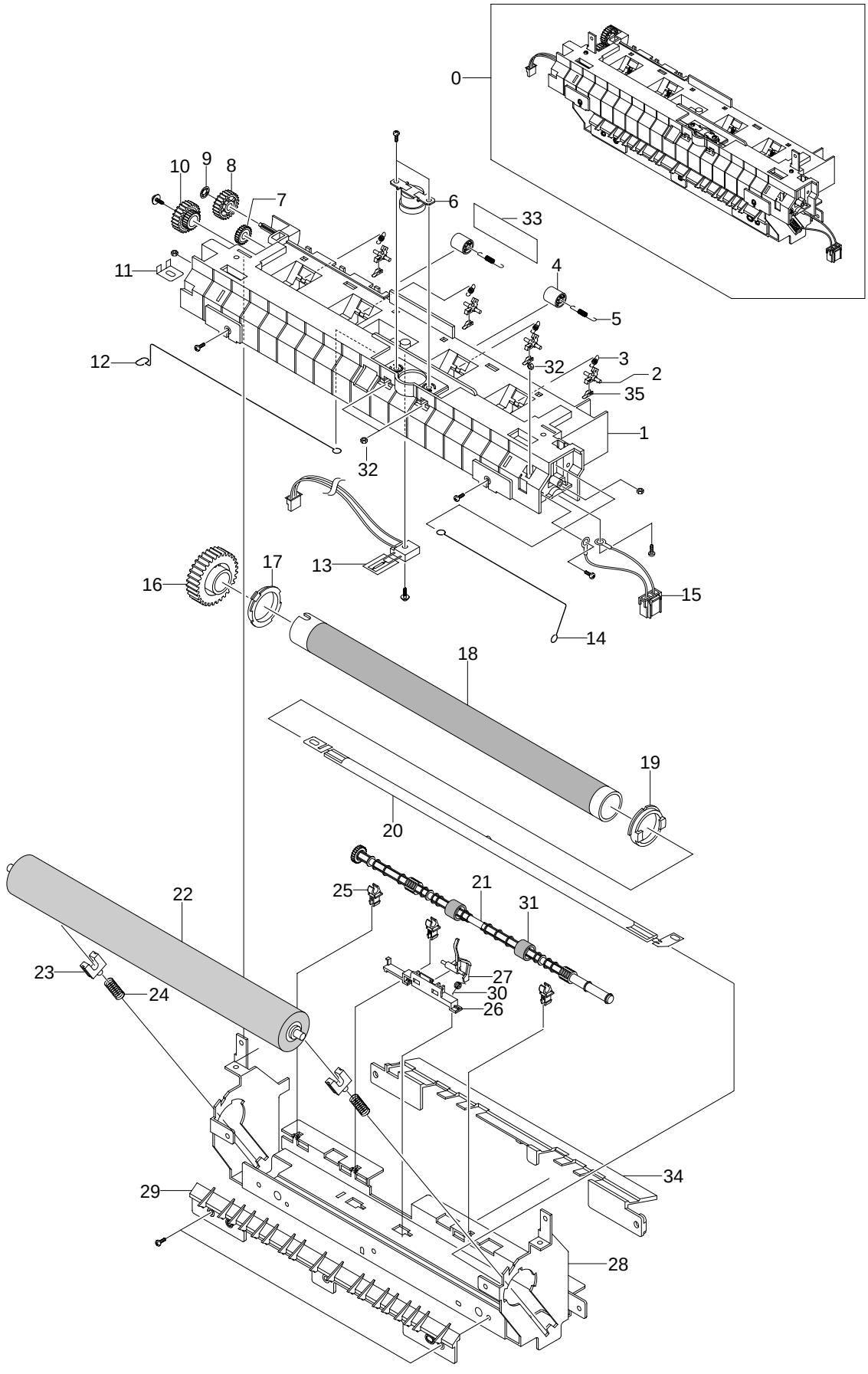
No.	Description	SEC.Code	Q'ty	SA	Remark
0	ELA HOU-UNIT FRAME_110V	JC96-02731A	1	O	110V
1	FRAME-M-BASE	JC61-00579A	1	X	
2	GUIDE-P-TR	JC61-00607A	1	O	
3	PLATE-P-SAW	JC61-00604A	1	O	
4	GUIDE-M-TR RIB	JC61-00594A	1	O	
5	PMO-GEAR_EXIT_DRV16	JC72-00143A	2	X	
6	RING-CS	6044-000001	3	X	
7	RMO-RUBBER_FOOT	JC73-00027A	2	X	
8	IPR-P-GROUND_TR	JC70-00311A	1	X	
9	MEC-TERMINAL	JC75-00049A	4	O	
10	IPR-P-TERMINAL CON	JC70-00312A	3	O	
11	IPR-P-TERMINAL CR	JC70-00313A	1	O	
12	HOUSING-TERMINAL	JC61-00592A	1	O	
13	PMO-LOCKER CST	JC72-00983A	2	O	
14	PMO-ACTUATOR CVR OPEN	JC72-00974A	1	O	
15	PMO-PLATE GUIDE DEVE_R	JC72-00985A	1	O	
16	SPRING ETC-GUIDE DEVE	JC61-70932A	2	X	
17	IPR-P-GROUND_GUIDE PAPER	JC70-00458A	1	O	
18	PMO-PLATE GUIDE DEVE_L	JC72-00984A	1	O	
19	PMO-ACTUATOR FEED	JC72-00976A	1	O	
20	PMO-ACTUATOR EMPTY	JC72-00975A	1	O	
21	PMO-ACTUATOR MANUAL	JC72-00977A	1	O	
22	IPR-P-GROUND_EARTH TR	JC70-00309A	1	X	
23	SPRING-ETC	6107-001162	1	O	
24	ROLLER-FEED ROLLER 1	JC66-00526A	1	X	
25	PMO-BUSHING FEED	JC72-00382B	5	X	
26	SHAFT-FEED	JC66-00398A	2	X	
27	AS-PICK UP	JC81-01693A	1	O	
27-1	BUSH-M-PICK_UP L	JC61-00586A	1	X	
27-2	SHAFT-P-PICK_UP	JC66-00399A	1	X	
27-3	STOPPER-PICK_UP	JC61-00593A	2	X	
27-4	PMO-IDLE PICK_UP	JC72-00982A	2	O	
27-5	SPONGE-ROLLER PICK_UP	JC72-01231A	1	O	
27-6	BUSH-M-PICK_UP R	JC61-00587A	1	O	
27-7	HOUSING-M-PICK_UP	JC61-00591A	1	O	
28	IPR-P-EARTH TRANSFER	JC70-00307A	1	O	
29	HOLDER-PTL	JC61-00583A	1	O	
30	LENS-PTL	JC67-00027A	1	O	
31	BUSH-M-TR L	JC61-00588A	1	O	

Frame Assembly Parts List

SA : Service Available
O : Service available **X** : Service not available

No.	Description	SEC.Code	Q'ty	SA	Remark
32	SPRING ETC-TR L HAWK	JC61-00047A	1	X	
33	ROLLER-FEED	JC66-00598A	1	O	
34	PMO-BUSHING_TR(L)	JC72-00102A	1	O	
35	IPR-P-GROUND_FUSER	JC70-00310A	1	O	
36	SHAFT-FEED IDLE	JC66-00527A	1	O	
37	BUSH-M-FEED IDLE	JC61-00585A	2	X	
38	SPRING ETC-TR	JC61-70958A	2	X	
39	IPR-P_GROUND_DRIVE2	JC70-00335A	1	O	
40	SPRING-TS	6107-001170	1	O	
41	CAM-M-PICK_UP	JC66-00377A	1	O	
42	IPR-P-GROUND_DRIVE	JC70-00308A	1	O	
43	SOLENOID-HB (PICK-UP)	JC33-00009A	1	O	
44	SOLENOID-HB (MANUAL)	JC33-00010A	1	X	
45	AS-GRAR PICK_UP	JC81-01692A	1	O	
45-1	PMO-GEAR PICK_UP B	JC72-00980A	1	O	
45-2	PMO-GEAR PICK_UP A	JC72-00979A	1	O	
45-3	SPRING-CS	6107-001167	1	X	
46	BRACKET-P-FEED	JC61-00602A	1	O	
47	MEA UNIT-LUTCH	JC97-01788A	1	O	
47-1	GEAR-FEED 1	JC66-00393A	1	O	
47-2	PMO-COLLAR_SPRING	JC72-00978A	1	O	
47-3	SPRING-TS	*	1	X	
47-4	PMO-HUB CLUTCH	JC72-00981A	1	O	
48	ELA HOU-FUSER 110V, ROCKY	TBD	1	O	110V
49	GUIDE-P-PAPER	JC61-00718A	1	O	
50	GEAR-FEED 2	JC66-00394A	1	O	
51	GEAR-IDLE 23	JC66-00396A	1	O	
52	SPRING-TS	6107-001164	1	X	
53	SPRING-TS	6107-001165	1	X	
54	IPR-P-TERMINAL DEVE KEY	JC70-00340A	2	X	
55	CBF HARNESS-OPC_FUSE	JC39-00229A	1	X	
56	PBA MAIN-PTL	JC92-01440B	1	X	
S	SCREW-TAPTITE	6003-000119	9	O	
S	SCREW-TAPTITE	6003-000196	12	O	
S	SCREW-ASS'Y TAPT	6006-001078	3	O	

8.9 Fuser Assembly

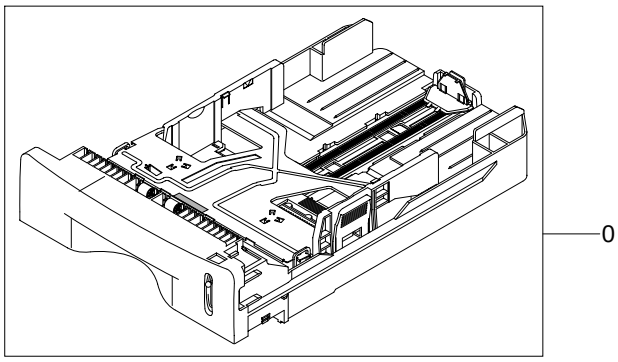


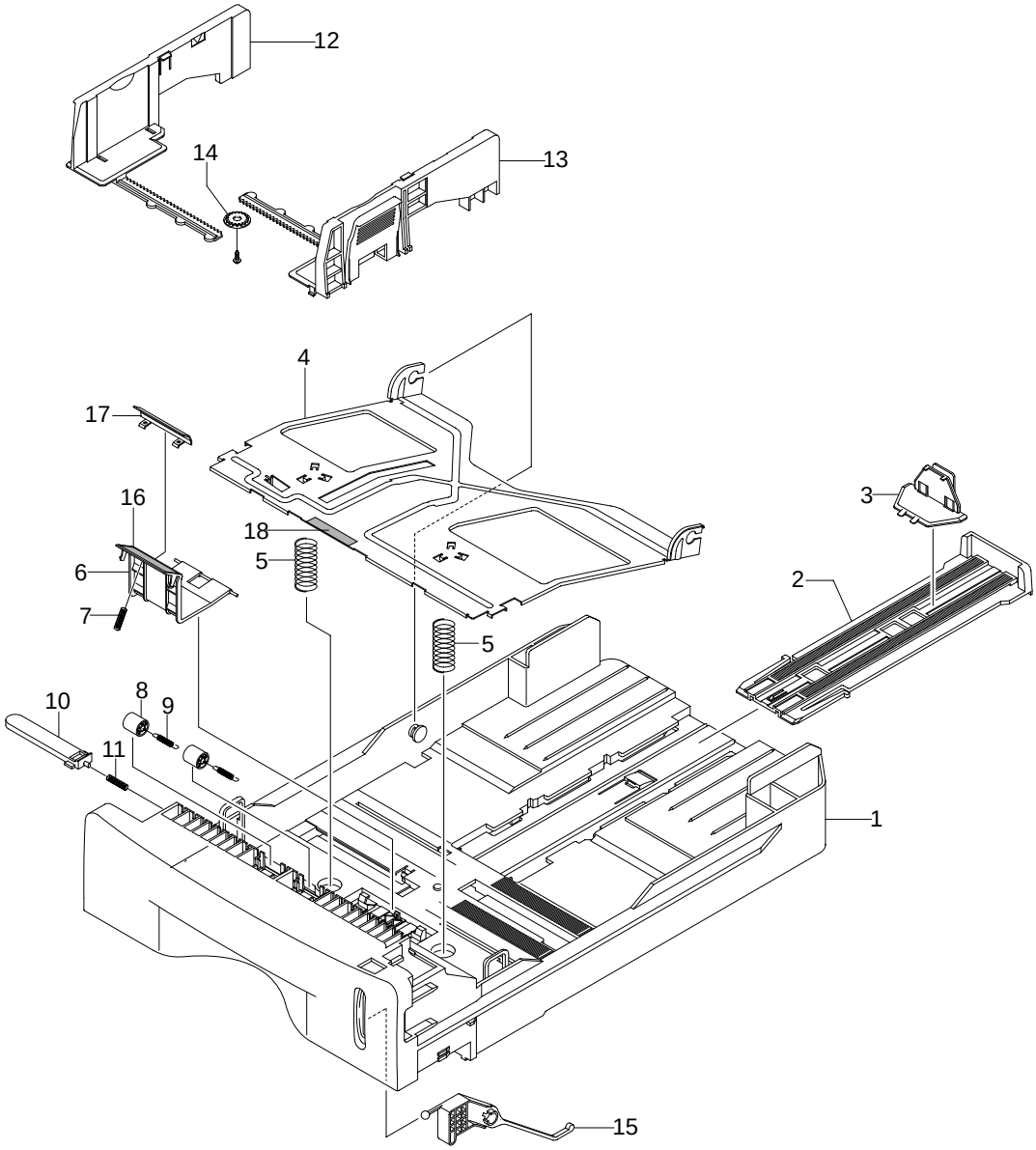
Fuser Assembly Parts List

SA : Service Available
O : Service available **X** : Service not available

No.	Description	SEC.Code	Q'ty	SA	Remark
0	AS-FUSER 110V	TBD	1	O	110V
1	COVER-M-FUSER	JC63-00105A	1	X	
2	HOLDER-M-PLATE CLAW	JC61-00584A	4	X	
3	SPRING ETC-CLAW	JC61-00064A	4	X	
4	PMO-ROLLER EXIT	JC72-60059A	2	X	
5	SPRING ETC-FUSER EXIT	JC61-70976A	2	X	
6	THERMOSTAT-150	JC47-00005A	1	O	
7	PMO-GEAR_EXIT_DRV16	JC72-00143A	1	X	
8	GEAR-IDLE 23	JC66-00396A	1	X	
9	RING-CS	6044-000001	1	X	
10	GEAR-RDCN 25/15	JC66-00397A	1	O	
11	IPR-ELECTRODE_LAMP	JC70-00275A	1	X	
12	ELECTRODE-WIRE_L	JC70-00450A	1	X	
13	THERMISTOR-NTC	1404-001298	1	O	
14	ELECTRODE-WIRE_R	JC70-00449A	1	X	
15	CBF HARNESS-FUSER 110V	JC39-00239A	1	O	110V (WHITE)
16	GEAR-FUSER, Z37	JC66-00564A	1	O	
17	BUSH-M-HR L	JC61-00589A	1	X	
18	ROLLER-HEAT	JC66-00601A	1	O	
19	BUSH-M-HR R	JC61-00590A	1	O	
20	LAMP-HALOGEN	4713-001155	1	O	110V
21	ROLLER-M-EXIT F/UP	JC66-00380A	1	X	
22	ROLLER-PRESSURE	JC66-00600A	1	O	
23	BEARING-PRESSURE/R	JC66-10901A	2	X	
24	SPRING-CS	6107-001168	2	X	
25	PMO-BUSHING TX	JC72-00382A	3	X	
26	HOLDER-ACTUATOR	JC61-00581A	1	X	
27	PMO-ACTUATOR_EXIT	JC72-00987A	1	O	
28	IPR-P-FRAME_FUSER	JC70-00317A	1	X	
29	GUIDE-M-INPUT	JC61-00595A	1	X	
30	SPRING-TS	6107-001165	1	X	
31	RMO-RUBBER_EXIT	JC73-00017A	2	X	
32	NUT-HEXAGON	6021-000222	5	X	
33	LABEL(P)-CAUTION, HOT_FUSER	JC68-30928D	1	X	
34	COVER-M-EXIT LOWER	JC63-00244A	1	X	
35	PLATE-P-CLAW	JC61-00605A	4	X	

8.9 Cassette Assembly



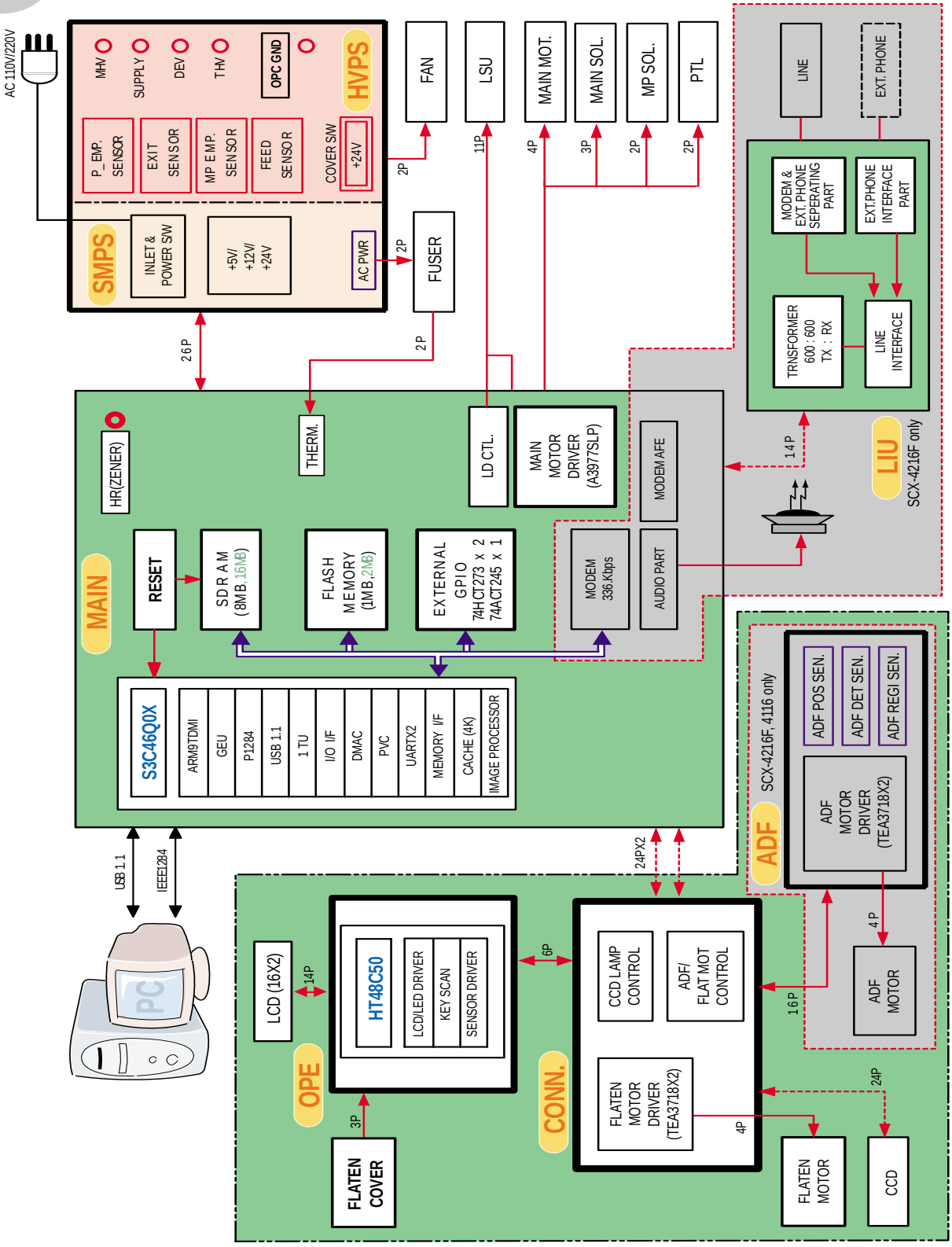


Cassette Assembly Parts List

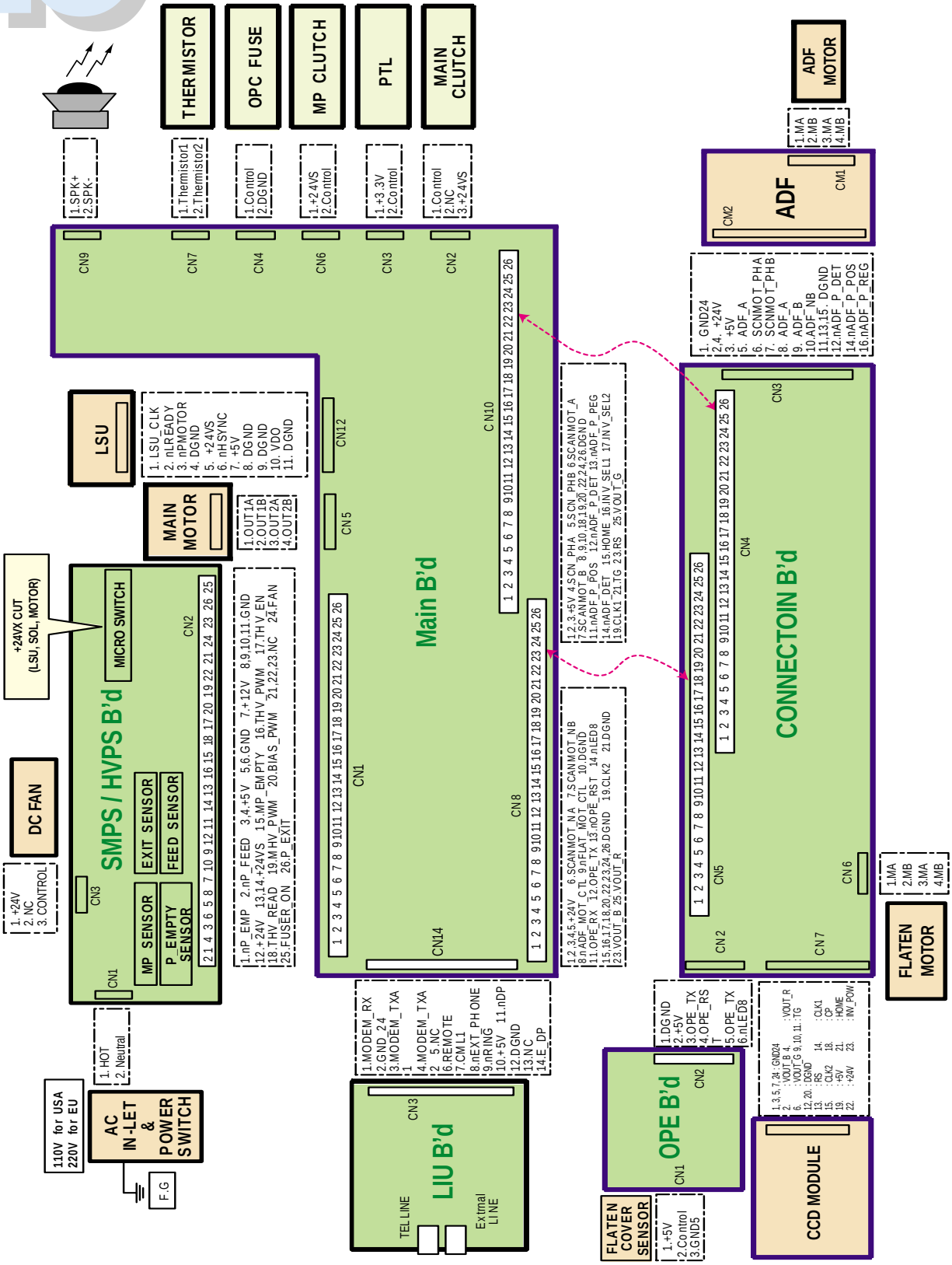
SA : Service Available
O : Service available **X** : Service not available

No.	Description	SEC.Code	Q'ty	SA	Remark
0	MEA UNIT-CASSETTE, USA	JC97-01750A	1	O	
1	FRAME-M_CASSETTE	JC61-00578B	1	X	
2	PMO-EXTENSION LARGE	JC72-00970B	1	O	
3	PMO-EXTENSION SMALL	JC72-00971A	1	O	
4	PLATE-P-KNOCK_UP	JC61-00603A	1	X	
5	SPRING-CS	6107-001166	2	X	Spring-Knock_up
6	HOLDER-M-PAD	JC61-00580A	1	X	
7	SPRING ETC-EXIT ROLL FD	JC61-70911A	1	X	
8	ROLLER-M-IDLE FEED	JC66-00529A	2	X	
9	SPRING-ES	6107-001047	2	X	Spring-Feed
10	PMO-PLATE_LOCKER	JC72-00972A	1	X	
11	SPRING ETC-LOCKER,PLATE	JG61-70531A	1	X	
12	ADJUST-M-CASSETTE_L	JC70-00300A	1	O	
13	ADJUST-M-CASSETTE_R	JC70-00301A	1	O	
14	GEAR-PINION	JG66-40003A	1	X	
15	INDICATOR-M-LEVER INDICATOR	JC64-00040A	1	O	
16	RPR-FRICTION PAD	JC73-00140A	1	O	
17	IPR-PLATE PAD	JC70-00314A	1	X	
18	RPR-PAD CASSETTE	JC73-00141A	3	X	

9. Block Diagram



10. Connection Diagram

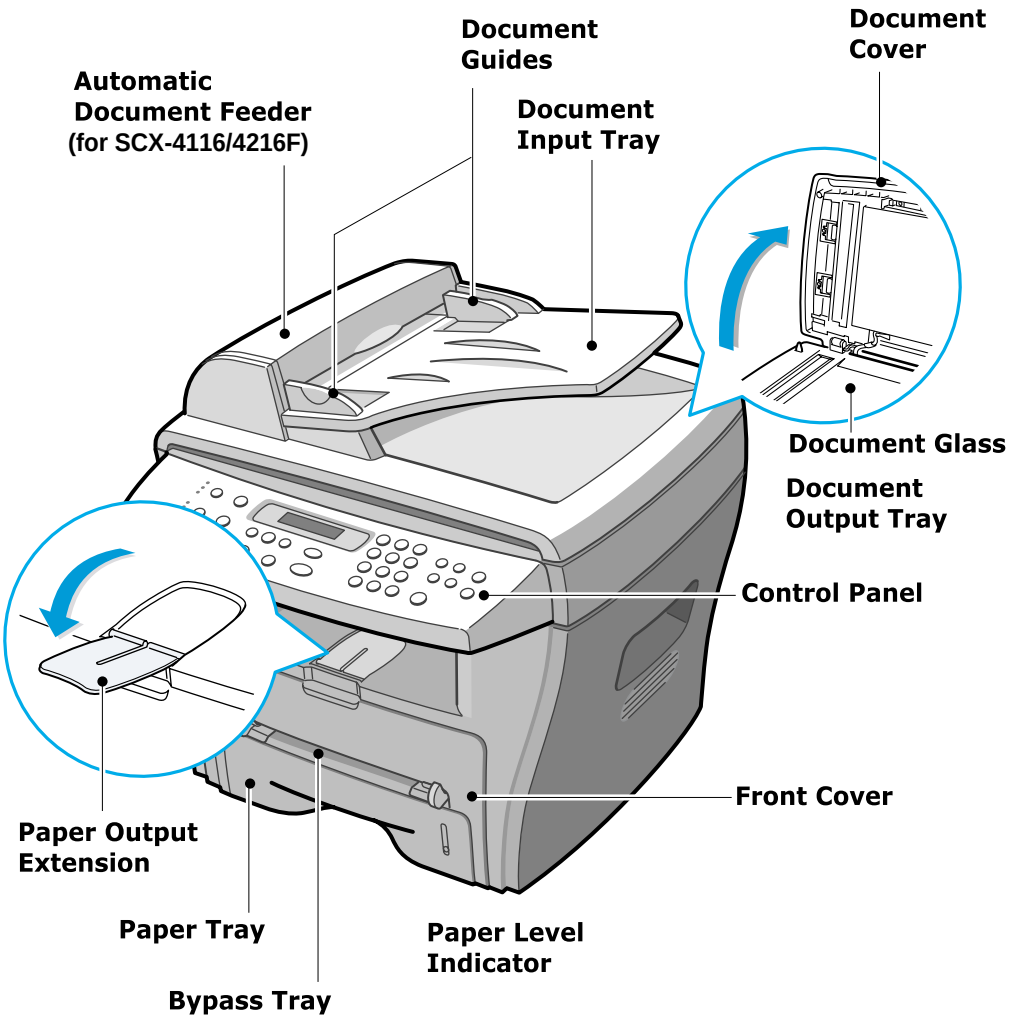


4. Summary of Product

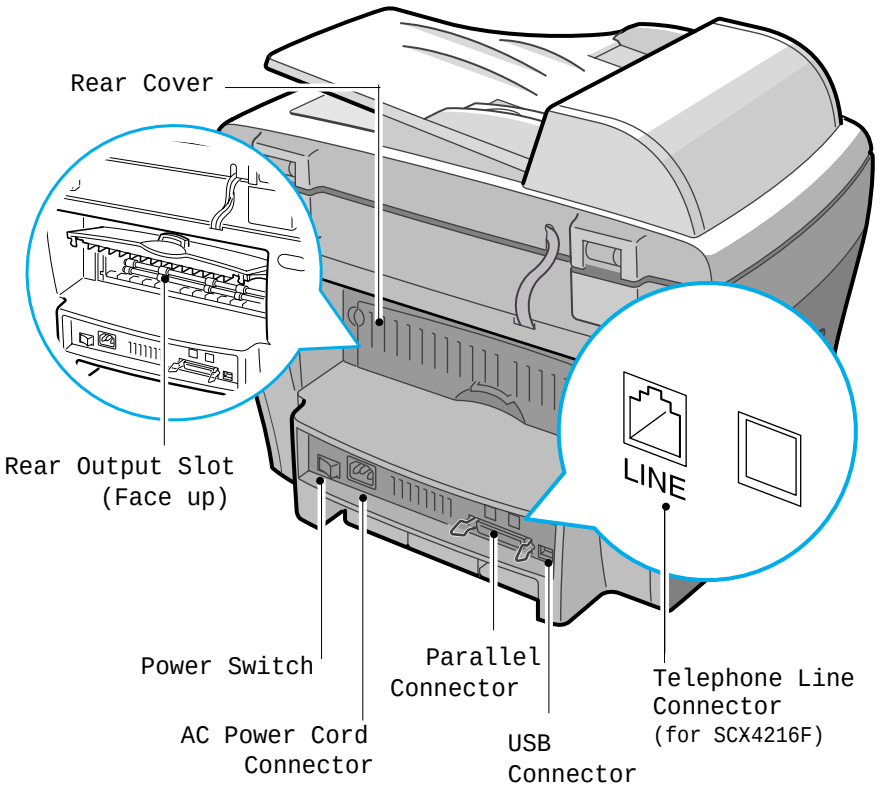
This chapter describes the functions and operating principal of the main component.

4.1 Printer Components

4.1.1 Front View

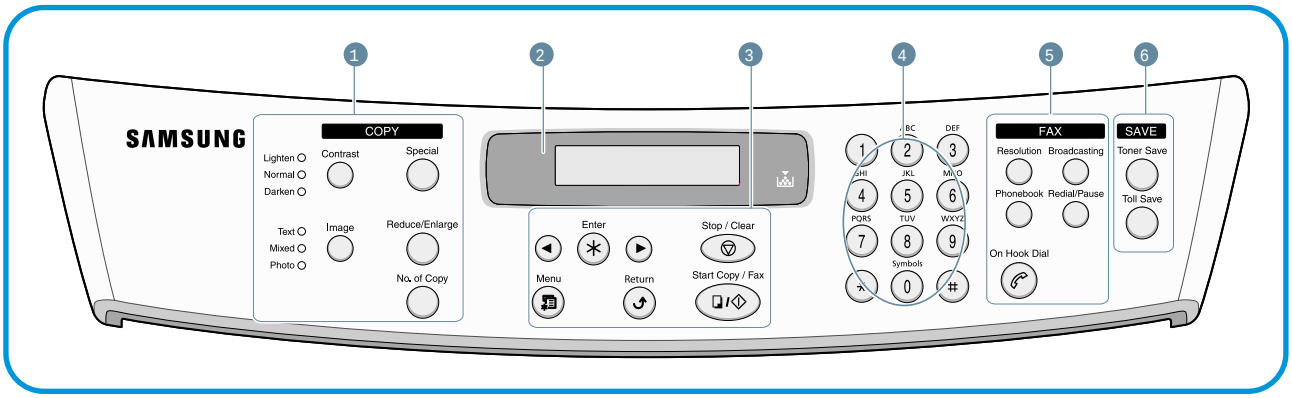


4.1.2 Rear View



4.1.3 Control Panel

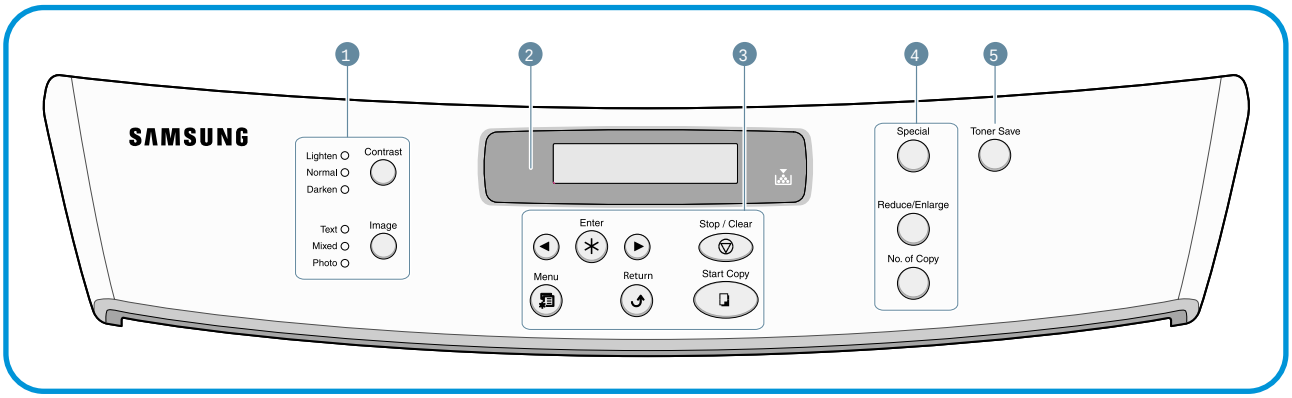
< SCX-4216F >



1 COPY	Contrast	Adjusts the brightness of the documents for the current copy job.
	Image	Selects the document type for the current copy job.
	Special	Allows you to use special copy features, such as Clone, Collation, Auto fit, 2-side, N-up (multiple pages on a sheet) and Poster copying.
	Reduce/Enlarge	Makes a copy smaller or larger than the original.
	No.of Copy	Selects the number of copies.
2		Displays the current status and prompts during an operation.
		Turns on when the toner cartridge is empty.
3		Scrolls through the options available for the selected menu item.
	Enter	Confirms the selection on the display.
	Menu	Enters Menu Mode and scrolls through the menus available.
	Return	Sends you back to the upper menu level.
	Stop / Clear	Stops an operation at any time. In Standby Mode, clears/cancels the copy options, such as the contrast, the image setting, the copy size and the number of copies.
	Start Copy / Fax	Starts a job.

4		Dials a number or enters alphanumeric characters.
5 FAX	Reduce/Enlarge	Adjusts the resolution of the documents for the current fax job.
	Broadcasting	Allows you to send a fax to multiple destinations.
	Phonebook	• Allows you to store frequently-dialed fax numbers using a one or two-digit speed dial or group number for automatic dialing and edit the stored numbers.
	Reduce/Enlarge	• Allows you to print a Phonebook list.Redials the last number in Standby Mode or inserts a pause into a fax number in edit mode.
	On Hook Dial	Engages the telephone line.
6 SAVE	Toner Save	Allows you to save on toner by using less toner to print a document.
	Toll Save	Allows you to save on call costs by sending a fax at a preset toll-saving time. Using this feature, you can take advantage of lower long distance rates at night, for example.

< SCX-4016/4116 >



1	Contrast	Adjusts the brightness of the documents for the current copy job.
	Image	Selects the document type for the current copy job.
2		Displays the current status and prompts during an operation.
		Turns on when the toner cartridge is empty.
3		Scrolls through the options available for the selected menu item.
	Enter	Confirms the selection on the display.
	Menu	Enters Menu Mode and scrolls through the menus available.
	Return	Sends you back to the upper menu level.
	Stop / Clear	Stops an operation at any time. In Standby Mode, clears/cancels the copy options, such as the contrast, the image setting, copy size and the number of copies.
	Start Copy	Starts a job.
4	Special	Allows you to use special copy features, such as Clone, Collation, Auto fit, 2-side, N-up (multiple pages on a sheet) and Poster copying.
	Reduce/Enlarge	Makes a copy smaller or larger than the original.
	No.of Copy	Selects the number of copies.
5	Toner Save	

4.2 System Layout

4.2.1 Feeding Part

There are the universal cassette, which loads papers, and the manual feeder, which supplies paper one by one. The cassette has the function pad which separates paper one by one, and it has the sensor function to check the existence of the loading paper.

- Feeding Method: Universal Cassette Type
- Feeding Standard: Center Loading
- Feeding Capacity: Cassette-250 sheets (75g/m^2, 20lb paper standard)
  Manual 1 sheet (Paper, OHP, Envelop, etc.)
- Paper detecting sensor: Photo sensor
- Paper size sensor: None

4.2.2 Transfer Ass'y

It is consisted of the PTL (pre-transfer lamp) and the Transfer Roller. The PTL sends a light to the OPC drum, makes the current on the drum surface to low, and improves the transfer efficiency.
The transfer roller delivers the toner of the OPC drum to the paper.

- The life span: Print over 60,000 sheets (in 15~30°C)

4.2.3 Driver Ass'y

It is a power delivery unit by gearing. By driving the motor, it supplies the power to the feeding unit, the fusing unit, and the distributing unit.

4.2.4 Fixing Part(Fuser)

- The fuser is consisted of the Heat Lamp, Heat Roller, Pressure Roller, Thermistor, and Thermostat. It adheres the toner to the paper with a pressure and a heat to complete the printing job.

4.2.4.1 Temperature-Intercepting Device (Thermostat)

The thermostat is the temperature-intercepting device, which cuts off the power for preventing an overheating or a fire when the heat lamp or the heat coil of the heat roller is overheated.

4.2.4.2 Temperature Detecting Sensor (Thermistor)

The Thermistor detects the surface temperature of the heat roller, and it maintains the regular temperature of the heat roller by responding to the information of the temperature.

4.2.4.3 Heat Roller

The heat roller transfers the temperature from the heat lamp coil to the surface to heat the paper which passes the surface. The melted toner cannot stain the heat roller coated with Teflon.

4.2.4.4 Pressure roller

The pressure roller mounted right under the heat roller is made of the silicon resin, and the surface of the roller is coated with Teflon to fuse the toner on the paper when paper passes between the heat roller and the pressure roller.

4.2.4.5 Safety Relevant Facts

• Protecting device when overheating
- 1st protecting device: H/W cuts off when detecting an overheating
- 2nd protecting device: S/W cuts off when detecting an overheating
- 3rd protecting device: Thermostat cuts off the power

• Safety device
- The power of the fuser is cut off when the front cover is open.
- The overheating safety device for customer
- Maintains the surface temperature of the Fuser Cover under 80°C and attach the caution label inside of the rear cover where customer can find easily.

4.2.5 Scanner

It reads an image with a photosensitive sensor. In hardware aspect, it is consisted of CCD module, Connection board, ADF board (4016 does not have ADF board), AFE (Analog Front End), and Image Processor (Located in CPU), and mechanically, it is consisted of flatten, and ADF (Automatic Document Feeder-SCX-4016 does not have ADF function)

• CCD Module Specification

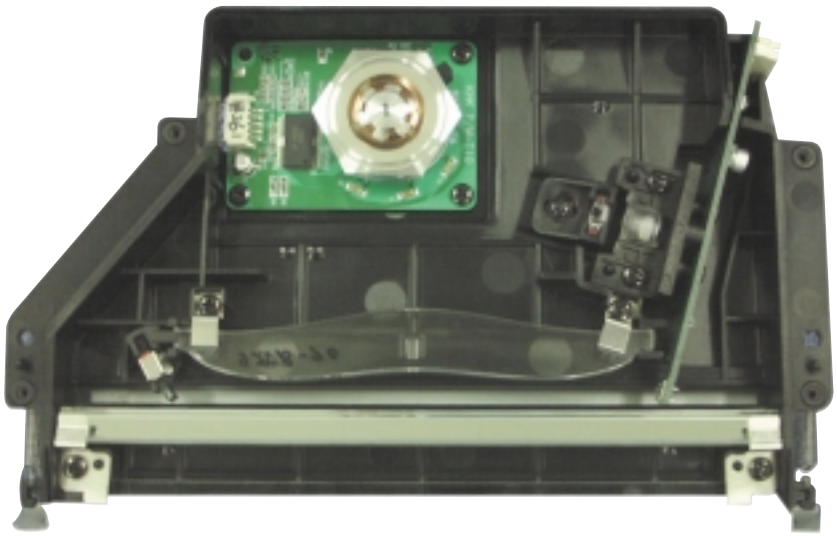
1.Resolution: 600dpi/A4
2.Maximum scan wide: 8.5”
3.Color filter: Red, Green, Blue
4.Output channel: 3 channels (R, G, B)
5.Effective pixel: 5,400 pixel *3
6.Voltage: 24V & 5V
7.Pre-heating time: Maximum 30 seconds (70% of light reach to it)
8.The life span of a lamp: 30,000 hours (25°C)

• Image Processor Specification

1.Operating frequency: 66MHz
2.Image sensor interface: 200/300/600 dpi CIS or CCD
3.Line time: Copy, FAX, Binary (Lineart, Halftone) PC Scan: 1.5ms/Line Color PC Scan (Grey, 256 Color, True Color): 4.5ms/Line
4.A/D conversion: 10bit conversion

4.2.6 LSU (Laser Scanner Unit)

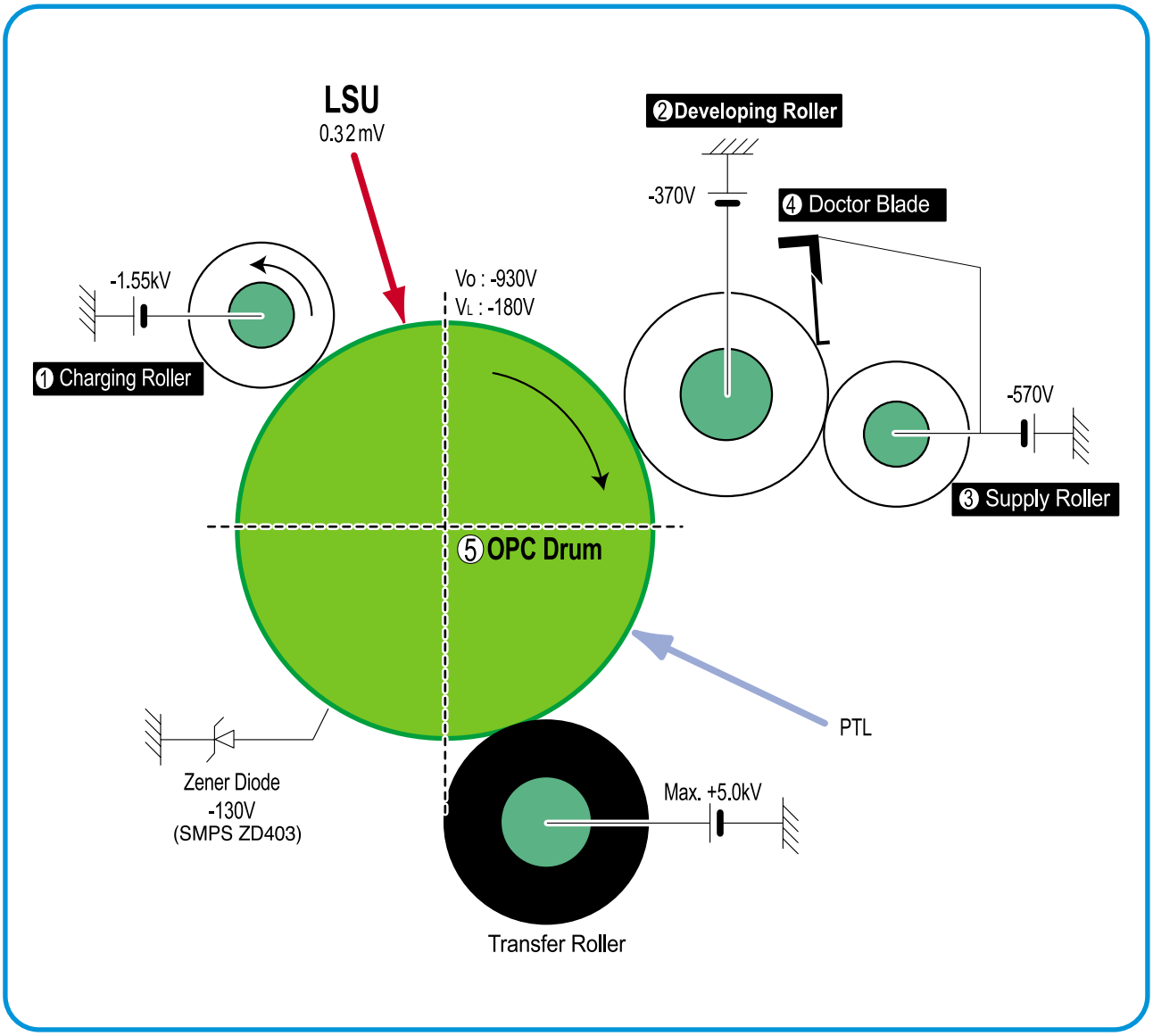
The LSU unit is controlled by the video controller. It scans the video data received from video controller with laser beam by using the rotation principal of the polygon mirror to create the latent image on the OPC drum. It is the core part of LBP.
The OPC drum rotates as the same speed as the paper feeding speed. It creates the /HS YNC signal and sends it to the engine when the laser bean of the LSU reaches the end of the polygon mirror, and the engine detects the /HS YNC signal to arrange the vertical line of the image on the paper. After detecting the /HS YNC signal, the image data is sent to the LSU to arrange the its left margin on the paper.
The one side of the polygon mirror is one line for scanning.



4.2.7 Toner Cartridge

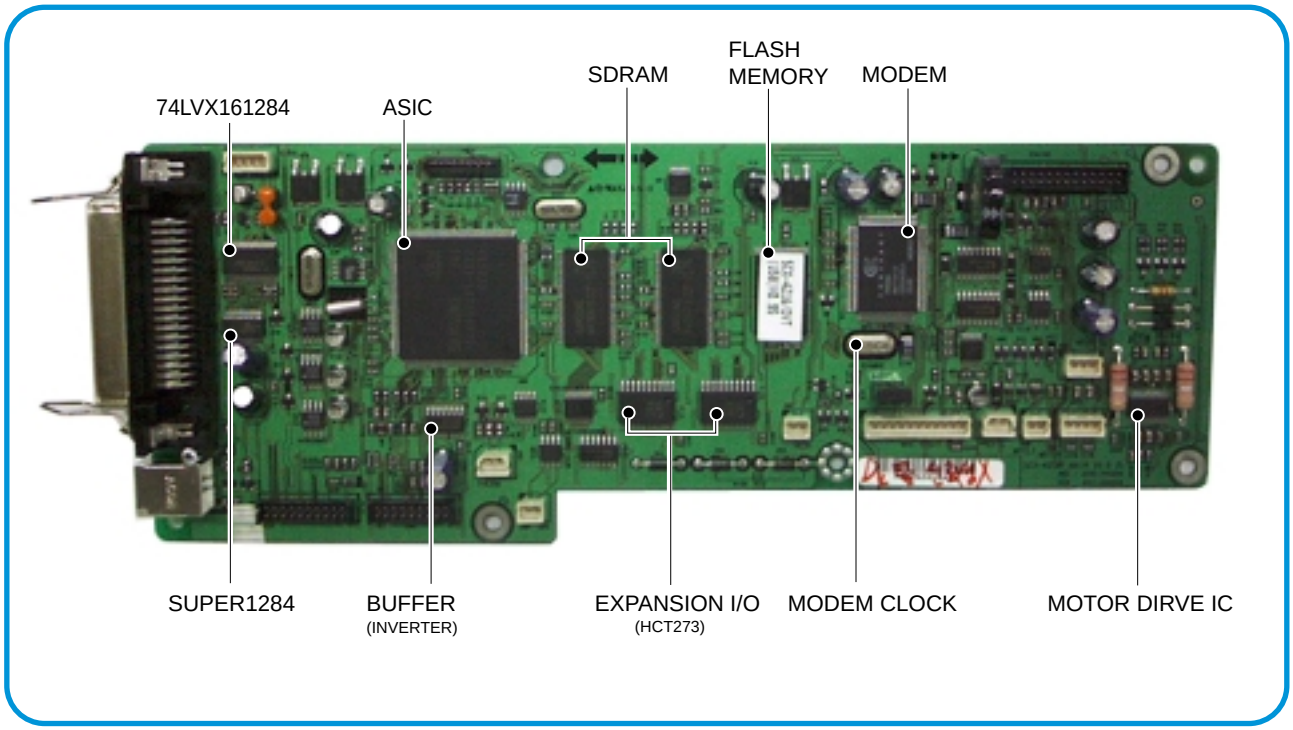
By using the electronic photo process, it creates a visual image. In the toner cartridge, the OPC unit and the developer unit are in a body. The OPC unit has OPC drum and charging roller, and the developer unit has toner, toner cartridge, supply roller, developing roller, and blade (Doctor blade)

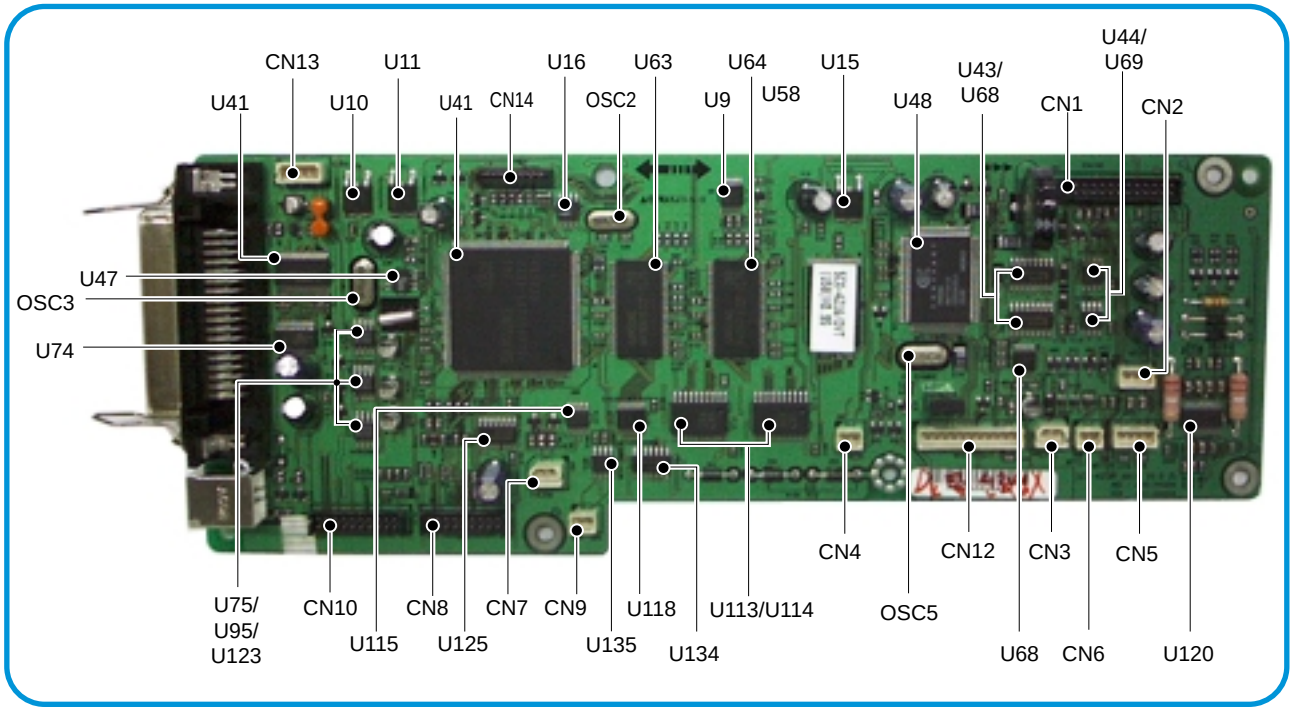
- Developing Method: Non magnetic 1 element contacting method
- Toner: Non magnetic 1 element shatter type toner
- The life span of toner: 3,000 sheets (IDC Pattern/A4 standard)
- Toner remaining amount detecting sensor: None
- OPC Cleaning: Collect the toner by using electric static + FILM OPC
- Management of disusable toner: Collect the toner by using electric static (Clenerless Type- No disusable toner)
- OPC Drum protecting Shutter: None
- Classifying device for toner cartridge: ID is classified by interruption of the frame channel.



4.3 Main PBA(SPL Model)

The Engine Board and the Controller Board are in one united board, and it is consisted of CPU part and print part in functional aspect. The CPU is functioned as the bus control, I/O handling, drivers, and PC interface. The main board sends the Current Image dlml Video data to the LSU and manages the conduct of Electrophotography for printing. It is consisted of the circuits of the motor (paper feed, pass) driving, clutch driving, pre-transfer lamp driving, current driving, and fan driving.
The signals from the paper feed jam sensor and paper empty sensor are directly inputted to the main board.





4.3.1 ASIC (Chorus2)

The Jupiter IV (16Bit RISC Processor), which is the executive controller to operate the printer function, is in use, and the each operation block is driven by system program of the flash memory. The whole system is controlled by driving operation block.

•Main function block

- Completely Integrated System for Embedded Applications,
- 16 Bit Risc Architecture, Efficient and Powerful ARM7TDMI CPU
- LSU Interface Module for Interfacing PVC or HPVC with LSU
- 2 Channel General Purpose DMA Controller for High Speed I/O
- Dual Memory Bus Architecture
- Operating frequency : 66MHz
- Operating power : 3.3V
- Power on reset time : under 6.6ms

4.3.2 Flash Memory

It stores the system program and downloads the system program through the PC interface.

- Capacity : 0.5 M Byte
- Access Time : 70 nsec

4.3.3 SDRAM

It is used as a swath buffer, system working memory area, etc. while printing.

- Access Time : 60 nsec

4.3.4 Sensor input circuit

1) Paper Empty Sensing

The Paper empty sensor (Photo Interrupter) on the engine board informs the state of paper to CPU whether it is empty or not with operation of the actuator.
When cassette is empty, it detects the fact by reading the D0 Bit of CPU, and then informs the fact by selecting the second LED(yellow) among the panel LEDs.

2) MP Sensing

By operation of Actuator on the frame, the MP Sensor (Photo Interrupter) on the engine board informs the state of paper to CPU whether it is empty or not. It reads the D0 Bit of CPU for recognizing paper in MP, and paper is fed from MP if there is.

3) Paper Feeding, Toner Cartridge Sensing

When paper passes the actuator (feed sensor part), it detects the signal of Photo interrupter, informs the paper feeding state to CPU, and then sprays the image data after certain time.
If it doesn't detect the feed sensor within 1 sec. after paper is fed, paper Jam0 is occurred (Red and Yellow will be turned on among the OP panel LEDs), and the fact whether the developer is inserted or not is detected with the same principle. After the developer is mounted, the actuator is operated. The signal from the photo interrupter is detected when it is passing the actuator of the sensor part. That is the developer ID sensing.

4) Paper Exit Sensing

It detects paper state whether paper gets out from the set with operation of exit sensor on the engine board and actuator on the frame. Paper detects the on/off time of exit sensor, and the normal operation or jam information is informed to the CPU.
The paper JAM2 is informed. (Red, Yellow LED will be turned on among the OP panel LEDs)

5) Cover Open Sensing

The Cover open sensor is located on the front cover. After the front cover is opened, +24V (DC fan, solenoid, main motor, polygon motor part of LSU, HVPS), which is supplied to the each unit, is cut off.
The cover-open sensing is operated by the D0 bit of CPU, and the developer ID sensing is operated.
In this case, the red LED among OP panel LEDs will be ON for informing the facts to user.

6) DC FAN / SOLENOID Driving

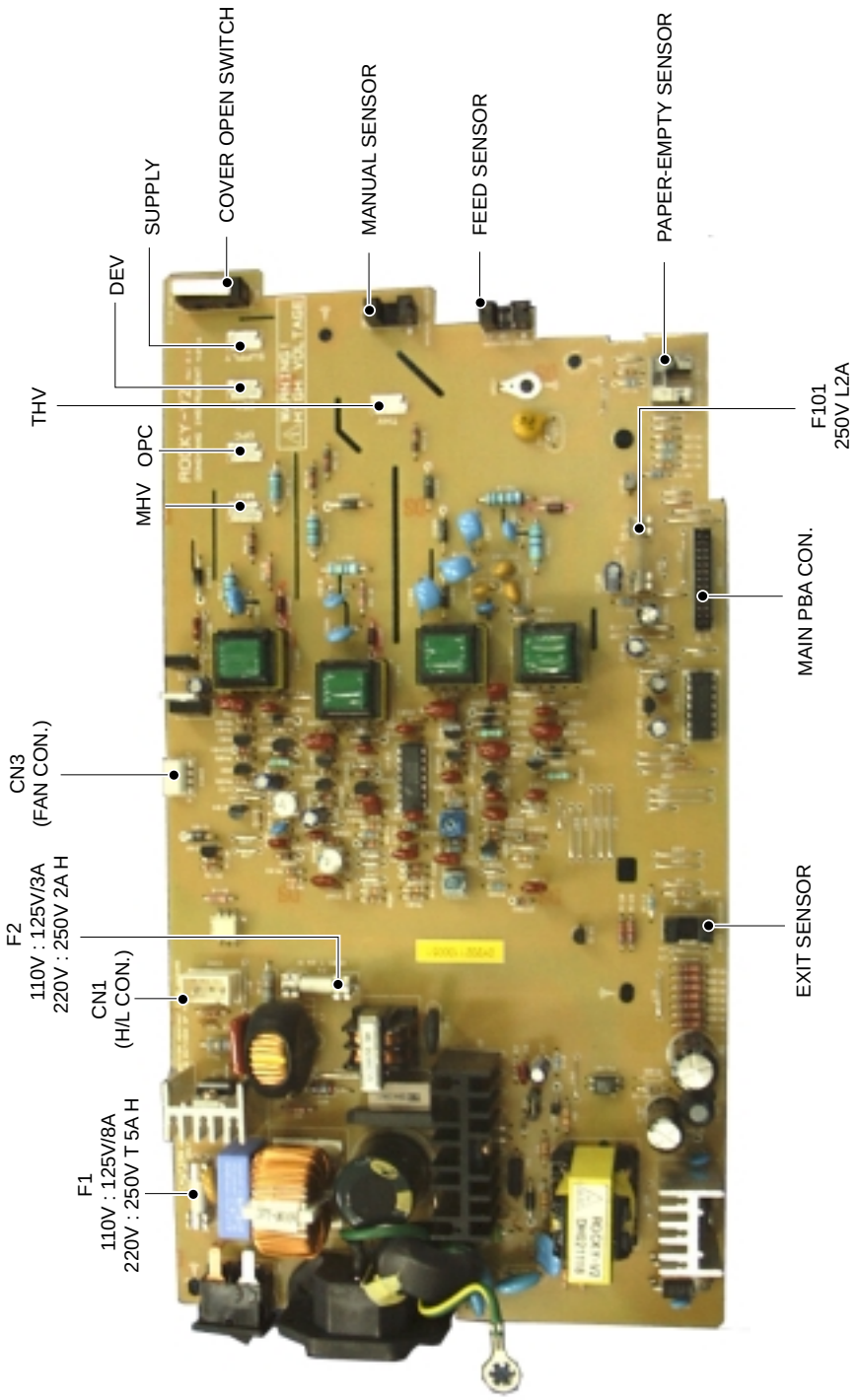
It is driven by transistor and controlled by D6 bit of CPU.
When it is high, the fan is driving by turning on the TR, and it is off when the sleep mode is selected.
There are two solenoids, and they are driven by paper pick-up and MP signal. Its driving time is 300ms. The diode protects the driving TR from the noise pulse, which is flown when the solenoid is de-energizing.

7) Motor Driving

The motor driving circuit is formed when the Driver IC is selected in the first place. The A3977 (Motor driver IC) is used in this case. But, the resistance Rs value of sensing and the voltage value of the V reference can be changed by motor driving voltage value.

4.4 SMPS & HVPS

The SMPS supplies the DC power to the system.
It takes 110V/220V and outputs the +3.3V, +5V and +24V to supply the power to the main board and ADF board.
The HVPS part creates the high voltage of THV/MHV/Supply/Dev and supplies it to the developer part for making the best condition to display the image. The HVPS part takes the 24V and outputs the high voltage for THV/MHV/BIAS, and the outputted high voltage is supplied to the toner, OPC cartridge, and transfer roller.



4.4.1 HVPS(High Voltage Power Supply)

1) Transfer High Voltage (THV+)

- Function: It is a voltage to transfer a toner developed on OPC drum to a paper.
- Output voltage: Maximum +5.0KV ±5% (Duty changeable, unload)
- 1.0KV ±15%(When cleaning, 200MOhm)
- Error: If THV (+) doesn't output, a ghost status (same character is printed after one cycle (76mm) of OPC) with a low density occurs due to a toner on OPC drum cannot normally transfer to a paper.

2) Charge Voltage (MHV)

- Function: It is a voltage to charge entire surface of OPC with -900V ~ -1000V.
- Output voltage: -1.3KV ~ 1.8KV DC ±50V
- Error: If MHV doesn't output, a black paper is printed out because toner on developing roller moves to OPC drum due to the surface of OPC is not charged.

3)Cleaning Voltage (THV-)

- Function: It removes a dirty on a surface by sending a minus toner in a transfer roller to an OPC drum to recover toners.
- Output Voltage: There is no feedback control, so change range of output is big up to load.
- Error: Toner contamination occurs at a backside of a printed-paper.

4) Developing Voltage (DEV)

- Function: It is a voltage to develop a toner with using a difference of electronic potential on an exposed part by LSU (Laser Scanning Unit).

* Generally, the electronic potential of exposed OPC is -180V and exposed developer is -350V when printing, so toner with minus (-) is developed on an exposed part.

- Output voltage: -200V ~ 600V DC ±20V
- Error: 1. If DEV is GND, a density is going significantly down.
  2. If DEV is floating due to instable contacting point of terminal, and etc., a density is significantly going up.

5) Supply Voltage(SUP)

- Function: It is a voltage to supply toner to a developing roller.
- Output voltage: : -400V ~ 800V DC °æ 50V(Use ZENER, DEV gear)
- Error: 1. If SUP is GND, a density is dramatically going down.
  2. If SUP is floating due to instable contacting point of terminal, and etc., a density is significantly going down as much as it cannot be recognized with eyes.

4.4.2 SMPS(Switching Mode Power Supply)

It is the power source for the whole system. It is an independent module, so it is possible to use for common use. It is mounted at the bottom of the set.
It is consisted of the SMPS part, which supplies the DC power for driving the system, and the AC heater control part, which supplies the power to fuser. SMPS has four outputting channels (+5V, +12V, +12Vand +24Vs).
There are three kinds of power, 120V exclusive (America), 220V exclusive (Europe), and 220V for china (nations with instable power supply).

1) AC Input

- Inputting rated voltage : AC 220V ~ 240V AC 120V / AC 220V
- Inputting voltage fluctuating range : AC 198V ~ 264V AC 90V ~ 135V / AC 198V ~ 264V
- Rated frequency : 50/60 Hz
- Frequency fluctuating range : 47 ~ 63 Hz
- Inputting voltage : Under 4.0Arms/2.0Arms
  (The state when lamp is off or rated voltage is inputted/outputted)

NO	Item	CH1	CH2	CH3	CH4
1	Channel name	+5V	+12V	+24.0V	+24.0VS
2	CONNECTOR PIN	CON 2 3.3V PIN: 3, 4 GND PIN: 5, 6	CON2 5V PIN : 8 GND PIN: 7	CON2 24V PIN: 13, 16 GND : 9, 10	CON2 24V PIN: 11, 12 GND : 18
3	Rated outputting voltage	+5V ± 5% (4.75 ~ 5.25V)	+12V ± 5% (11.4 ~ 12..6V)	+24V ± 10% (21.6 ~ 26.4V)	+24V ± 10% (21.6 ~ 26.4V)
4	Rated outputting current	1.0 A	0.05A	1 0 A	0.5
5	Ripple noise voltage	150mVp-p	150mVp-p	500mVp-p	500mVp-p
6	Maximum output	7.5W	0.6W	36.0W	24.0W

3) Consumption Power

NO	Item	CH1 (+5V)	CH2 (+12V)	CH3 (+24V)	CH3 (+24VS)	System
1	Stand-By	1.0 A	0.05A	1.0 A	0.5 A	AVG : 95 Wh
2	PRINTING	1.5 A	0.5A	1.5 A	1.0 A	AVG : 350 Wh
3	Sleep-Mode	0.3A	0.0A	0.0A	0.06A	AVG : 20 Wh

4) Length of Power Cord : 1830 ± 50mm

5) Power Switch : Use

6) Feature
- Insulating resistance : over 50MΩ (at DC500V)
- Insulating revisiting pressure : Must be no problem within 1min. (at 1500Vzc, 10mA)
- Leaking voltage : under 3.5mA
- Running voltage : under 40A peak (at 25°c, Cold start) Under 60A peak (in other conditions)
- Rising Time : Within 2Sec
- Falling Time : Over 20ms
- Surge : Ring Wave 6KV-500A (Normal, Common)

7) Environment Condition
- Operating temperature range : 0°c ~ 40°c
- Maintaining temperature range : -25°c ~ 85°c
- Maintaining humid range : 30% ~ 90% RH
- Operating atmospheric pressure range : 1

8) EMI Requirement : CISPR ,FCC, CE, MIC, C-Tick,

9) Safty Requrement
- IEC950 UL1950, CSA950, C-UL,NOM,TUV,Semko,Nemko,iK,CB, CCC(CCIB),GOST, EPA,

4.4.3 Fuser AC Power Control

Fuser (HEAT LAMP) gets heat from AC power. The AC power controls the switch with the Triac, a semiconductor switch. The 'On/Off control' is operated when the gate of the Triac is turned on/off by Photo triac (insulting part).
In the other words, the AC control part is passive circuit, so it turns the heater on/off with taking signal from engine control part.
When the 'HEATER ON' signal is turned on at engine, the LED of PC1 (Photo Triac) takes the voltage and flashes. From the blinking light, the Triac part (light receiving part) takes the voltage, and the voltage is supplied to the gate of Triac and flows into the Triac. As a result, the AC current flows in the heat lamp, and heat is occurred.
On the other hand, when the signal is off, the PC1 is off, the voltage is cut off at the gate of Triac, the Triac becomes off, and then the heat lamp is turned off.

1) Triac (THY1) feature
- 12A,600V SWITCHING

2) Phototriac Coupler (PC3)
- Turn On If Current : 15mA ~ 50mA(Design: 16mA)
- High Repetive Peak Off State Voltage : Min 600V

4.5 Engine F/W

4.5.1 Feeding

If feeding from a cassette, the drive of the pickup roller is controlled by controlling the solenoid. The on/off of the solenoid is controlled by controlling the general output port or the external output port. If feeding from a manual feeder, decide to insert the paper according to the operation of the manual sensor, and by driving the main motor, insert the paper in front of the feed sensor. While paper moves, occurrence of jam is judged as below. (Refer to the [6.2 Paper Transfer rout])

4.5.1.1 Jam 0

- After picking up, paper cannot entered due to paper didn't feed.
- After picking up, paper entered but it cannot reach to the feed sensor in certain time due to slip, etc.
- After picking up, if the feed sensor is not on, repack up. After repacking up, if the feed sensor is not on after certain time, it is Jam 0.
  - It is a status that the leading edge of the paper doesn't pass the feed sensor.
- Even though the paper reaches to the feed sensor, the feed sensor doesn't be on.
  - It is a status that the leading edge of the paper already passes the feed sensor.

4.5.1.2 Jam 1

- After the leading edge of the paper passes the feed sensor, the tailing edge of the paper cannot pass the feed sensor after certain time. (The feed sensor cannot be Off)
- After the leading edge of the paper passes the feed sensor, the paper cannot reach the exit sensor after certain time. (The exit sensor cannot be On)
  - The paper exists between the feed sensor and the exit sensor.

4.5.1.3 Jam 2

- After the tailing edge of the paper passes the feed sensor, the paper cannot pass the exit sensor after certain time.

4.5.2 Drive

By gearing, the main motor drives the rollers such as feeding roller, developing roller, fuser roller, and distributing roller. The step motor is controlled for the sections, acceleration section and fixed speed section. In the initial stage of the motor run, appoint the acceleration section to prevent the isolation of the motor. It is controlled by the A3977 motor driver IC. The step signal and the enable signal are sent to make the phase for driving the motor in CPU.

4.5.3 Transfer

The charging voltage, developing voltage and the transfer voltage are controller by PWM (Pulse Width Modulation). The each output voltage is changeable due to the PWM duty. The transfer voltage admitted when the paper passes the transfer roller is decided by environment recognition. The resistance value of the transfer roller is changed due to the surrounding environment or the environment of the set, and the voltage value, which changes due to the environments, is changed through AD converter. The voltage value for impressing to the transfer roller is decided by the changed value.

4.5.4 Fusing

The temperature change of the heat roller's surface is changed to the resistance value through the thermistor. By converting the voltage value, which impressed to the resistance, to the digital value through the AD converter, the temperature is decided. The AC power is controlled by comparing the target temperature to the value from the thermistor. If the value from the thermistor is out of the controlling range while controlling the fusing, the error stated in the table occurs. (For the domestic model, the Q-PID method has been applied.)

4.5.4.1 Error Type

Error	Description	DCU	LED Displat
Open heat error	When warming up, it has been lower than 68°C over 28 seconds	60	All LED are blinking.
Lower heat error	• Standby: It has been lower than 80°C over 10 seconds • Printing: - 2 consecutive pages: it has been lower than 145°C over 4 seconds. - 3 consecutive page; it has been 25°C lower than the fixed fusing temperature over 4 seconds.	62	All LED are blinking
Over heat error	It have been higher than 220°C over 3 seconds	68	All LED are blinking

4.5.5 LSU

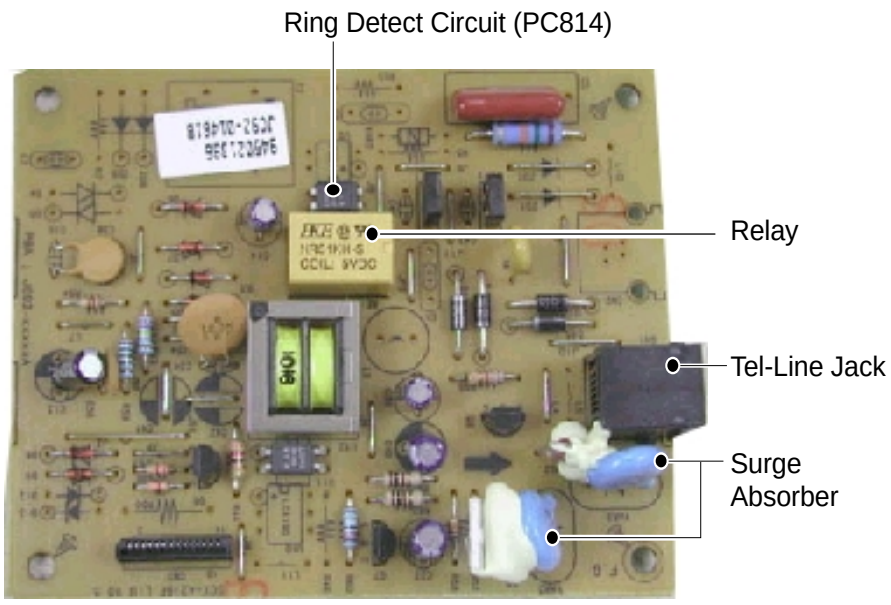
The LSU is consisted of the LD (Laser Diode) and the polygon motor control. When the printing signal occurs, it turns the LD and drives the polygon motor. When the receiving light part detects the beam, Hsync occurs. When the polygon motor speed becomes a normal, LReady occurs. If two conditions are satisfied, the status bit of the LSU controller register becomes 1 to be judged that the LSU is ready. If two conditions are not satisfied, the error shown in below occurs.

Error	Description	DCU
Polygon motor error	When the polygon motor's speed doesn't become a normal	95
Hsync error	The polygon motor's speed is normal, but the Hsync signal is not created.	96

4.6 LIU PBA

LIU board is a Line interface unit, and it is a circuit for interfacing a telephone line with a modem. The circuit is consisted of matching transfer to conform to impedance of a receiving telephone line and a circuit to conform to impedance of a modem.

Also, there are a ring detect circuit to detect a ring signal from a switchboard and a surge absorber to protect it from a thunderbolt located on a line input unit.



4.7 OPE PBA

OPE board is consisted of various function keys and LCD to display an operation of key. MICOM creates a circuit with using HT48R50 MICOM of HOLTEC CO. and applies LED and LCD. A communication method with a CPU of a main board is UART, and related signals are /Reset, TXD, and RXD.